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T. A. RICKARD . . . . . EDITOR

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EDITORIAL.

THAT DEPARTMENT of this JOURNAL which is entitled 'Special Correspondence' has grown fast during the last two years. It gives letters from well-qualified men in the leading mining districts of the world, and is therefore of particular interest to our readers. Lately a weekly letter from Houghton, the port of entry of the Lake Superior copper mines, has been added, as well as correspondence from Dawson, giving the latest intelligence from the Yukon. We have found it necessary, beginning with this issue, to give an additional page to this department.

NEARLY THREE-QUARTERS of the total dividends of $6,617,666 reported to THE ENGINEERING AND MINING JOURNAL in August, by 36 mining and metallurgical companies in the United States, was contributed as a 5 per cent quarterly dividend by the Standard Oil Company. The second largest payer was the Calumet & Hecla copper mine, which declared $10 quarterly, or $1,000,000, an amount equivalent to 15 per cent of the total disbursed by all companies during the month. In detail the declaration of dividends was as follows: Three copper mines, $1,525,000; 17 gold, silver and lead, $1,041,732; one zinc, $750; total metal mines, $2,567,482. Eleven oil companies gave $4,918,067; three coal, $113,117; one chemical, $19,000; total industrial, $5,050,184. In addition to these dividends Americans collected part of the $45,750 declared by one Mexican mine, and $15,000 by one Central American.

THE LABOR agitator is having an enjoyable time in Western Australia, and if he goes ahead with his present destructiveness he will kill the goose that lays his golden eggs—that is, destroy the prosperity of the mining region that produces annually $40,000,000 of golden ore. The latest vagary is embodied in a motion made before the meeting of a branch of the Australian Workmen's Association, held at Boulder, which adjoins Kalgoorlie. The motion read: "Recognizing that by the great influx of labor-saving machinery the workers on the mines are being thrown out of employment, we, the members of this union, are of opinion that it is high time that steps should be taken to move in the direction of getting

six hours as a recognized day's work on the mines."

If the workman only realized how great a stimulus to the invention of labor-saving machinery, with a view to the elimination of his labor, is afforded by his excessive demands, he would, perhaps, abate the continual effort to give less for the wages he receives and be content to let well alone.

THE BRITISH members of the Society of Chemical Industry who have been visiting the United States appear to have been impressed with the great application of electricity in labor-saving machinery. "In England labor is cheap and labor does the work. Here labor is expensive. We have found electricity in use everywhere. Every operation, no matter on how gigantic a scale, becomes independent of labor by the use of electricity." So said one of the most observant of our visitors. If he had visited the smelters and mines, he would have seen the same tendency in course of development.

THE EXPORTS AND imports of silver, at commercial value, are given by the Bureau of Statistics as below, for the eight months ending August 31. We add the approximate quantity of the net exports, calculated at the average price for the period, the figures being in ounces:

	1903.	1904.	Changes.
Exports	$22,540,420	$35,751,145 I.	$13,210,725
Imports	14,914,030	17,674,195 I.	2,760,165
Net exports	$7,626,390	$18,076,950 I.	$10,450,560
" ounces	14,844,900	31,952,600 I.	17,107,700

The net exports this year show an increase of 137.0 per cent in value, and of 115.2 per cent in quantity, a remarkable gain. As our production of silver did not vary greatly from last year, the net exports amounted to about 88 per cent of our production. As usual, the market has been largely dependent upon the East. Prosperity in India has resulted in large demands for the metal from that country. China has also called for larger supplies, and it is quite probable that a considerable amount has been taken indirectly by the two powers which are now at war in Chinese territory. The present indications are, however, that Indian requirements for the year are nearly filled, and that exports for the remainder of the year will be on a somewhat smaller scale.

ON ANOTHER page we publish an outline of a theory of gold deposition in veins which has been brought forward by Mr. William Bradford, a practical miner and skillful observer, of Ballarat, in Australia. Mr. Bradford has contributed a good many interesting observations on this subject, and they form the basis for quite a series of bulletins published by the Geological Survey of Victoria. Throughout these contributions to mining geology there runs the idea that gold is deposited by the downward filtration of solutions along 'drains' in the Silurian slates of such well-known districts as Ballarat, Creswick, Bendigo and Wedderburn. We do not endorse this theory, and we are surprised that the Victorian Survey has allowed it to run rampant through its geological literature; but we do believe that the observations, sketches and facts collected by Mr. Bradford are of considerable value if interpreted in the light of scientific study. The 'drains' he refers to and the downward percolation of solutions from surface, if regarded as factors in the secondary enrichment of gold lodes and the formation of those pockets or bonanzas which occur down to about the groundwater level, are tenable propositions, but as a general explanation of the widespread phenomena of ore deposition they appear to us to be ill-founded, and it seems fair to say that these theories should not have been promulgated without more scientific treatment by the officers of the Geological Survey of Victoria.

IRON ORE.

In making its great output of pig iron last year, the United States consumed approximately 35,000,000 tons of iron ore, the average being about 1.8 tons of ore per ton of iron. Nearly all of the ore was mined in this country, only 2.7 per cent of the total being imported. The foreign supply came chiefly from Cuba and Canada; the Cuban ore being all used in a few furnaces on the Atlantic coast.

By far the greater part of the iron ores mined and used in this country are hematites. The carbonate ores—mined only in Ohio—formed 0.1 per cent of the total, the output of the once famous black-band ores of that State having fallen to insignificant proportions. The magnetites—mined chiefly in New Jersey and New York—were 4.4 per cent of the total. The red hematites formed 86 per cent, and the brown hematites 9.5 per cent. The line between these two varieties is not always closely drawn; but together they made 95.5 per cent of the total.

The following table shows, by percentages, the different districts from which the iron ore supplies of the United States are derived; and, in the second column, the proportions of the total pig iron output made from the ores of each region. The latter calculation is based on the average tenor of the ores, but is believed to be approximately correct:

	Iron Ore.	Pig Iron.
Lake Superior	74.0	78.9
Alabama	10.2	7.5
Other Southern States	6.1	4.5
Atlantic Seaboard States	4.8	4.4
Rocky Mountain States	1.8	1.6
Southwestern States	0.3	0.3
Ohio	0.1	0.1
Imported ores	2.7	2.7
Totals	100.0	100.0

No ore was mined on the Pacific Coast, which is, indeed, not well supplied with iron ore, the only deposits known to be of probable extent and value being in the State of Washington. California's varied mineral output does not include iron ore available for the establishment of a local iron and steel industry. If such an industry is established at all on the coast it will be probably in the Puget Sound country.

These figures show how dependent our iron and steel industry is upon the Lake Superior region for its supplies of raw material. There is no other district now producing iron ore in which an early expansion of output is possible, except the Alabama belt. There are large possibilities in Wyoming, perhaps, but the ore deposits there are remote from transportation, and a considerable time must elapse before they become economically available. Other deposits, in the Southwest, cannot be profitably exploited, for similar reasons.

Fortunately, it is certain that the reserves of iron ore in the Lake Superior country are sufficient to meet the calls upon them for many years to come. It is to be hoped that, before their time of exhaustion approaches, metallurgical progress may make it possible to use raw material not now taken into consideration, such as the great deposits of titaniferous ores, in the Adirondack region and elsewhere, to which a correspondent referred in our last issue.

Meantime the Lake Superior country controls the iron situation; and it seems probable that it will continue to do so for many years to come.

REGARDING ANTHRACITE STATISTICS.

While the compiling of statistics by Government and State authorities is not as exact a process here as in some European countries, notably Germany, yet, as a rule, we Americans realize that the value of statistics to the ordinary citizen is determined not only by the accuracy with which results are obtained, but by the promptitude with which totals are compiled and published. Possibly some data are published too hastily by our government departments, and are not as accurate as they might be—such criticisms have been made of crop estimates sent out by the Department of Agriculture. The statistics of the Geological Survey, however, have of late years commanded respect.

A matter that possibly is not of great importance has attracted our attention, and we take it up in detail here to show some difficulties that beset compilers of statistics, and the absurdity of any compiler claiming that his methods are infallible and his results unimpeachable.

The published statement of the Bureau of Mineral Statistics of the United States Geological Survey gives the output of anthracite coal in Pennsylvania as 66,351,713 gross tons, or 74,313,919 net tons; the total of the Pennsylvania Bureau of Mines is 67,171,951 gross tons, equal to 75,232,585 net tons. Here is a difference of over 900,000 tons, an amount which looks big, but really represents a difference of only about 1.2 per cent. Still 900,000 tons of

coal is quite a lot, and we venture to guess the causes of the discrepancy.

We do not know exactly how the Government totals were compiled, but presume they were made from returns of individual companies or from figures furnished by a private organization, the Bureau of Anthracite Statistics. The figures of the State are compiled from returns made by the mine inspectors of the various anthracite districts. It is likely that the Government and State figures of the coal shipped from the breakers substantially agree, since these figures are known pretty well by certain company officials, and any discrepancy would lead to inquiries being made. The difference of 900,000 tons is due probably to varying estimates of the amount of coal used at the mines. The claim made in the past by the Geological Survey that its figures are more accurate than those of the State, because they include the output of small mines not reported by the State, is of little weight. The output of anthracite mines employing less than 10 men is insignificant, and in any event allowance for small mines should make the Survey's figures larger than those of the State, while actually they are smaller.

The amount of coal used at the mines is hard to determine. We presume the figures of the Bureau of Anthracite Statistics are from reports made by companies. The State figures are collected by mine inspectors. The only difference is that the Survey figures may be based upon better estimates than those of the State. Reports of coal used made by mine inspectors have in the past contained glaring absurdities, such as a plant of 12 boilers using twice as much coal as a neighboring plant of 18 similar boilers running the same length of time, because the inspector took the off-hand estimate of a head fireman or an outside foreman; but probably they are compiled more accurately now. The following table gives the amounts used for the past four years, according to the returns of the State Department of Mines:

Years.	Production.	Used at Mines.	Per Cent.
1900	51,217,318	4,880,932	9.53
1901	59,905,951	5,279,025	8.79
1902	36,911,554	4,424,779	12.98
1903	67,171,951	5,710,341	8.50

The results, as might be expected, show that the proportion used at the mines is least when the mines are worked to nearly full capacity, the abnormally high percentage of 1902 being caused by pumps and ventilating fans that had to be kept going, though mining was suspended during the strike.

These figures indicate that in a normal year about 9.75 per cent of the coal produced at the mines is used as fuel at the collieries, but this amount is not a definite quantity, for the simple reason that at many boiler plants no attempt is made to weigh the small stuff, sometimes largely jig refuse, that is used. The amount may be roughly estimated as so many carloads. If, as is often the case, the boiler house is supplied by a scraper line, then estimates of amounts burned may vary widely. As before stated, the matter is not of much importance, but is discussed here because of its bearing on the fallibility of some statistics.

TO THE MINING STUDENT.

In this issue we publish a portion of an address delivered at Dalhousie University by Professor Sexton. It contains a great deal of good sense, touched by the occasional glow of an eloquence which warms the reader, and it expresses ideas which come very near home to those professional men who have learned in the laboratory of life that the crucible and the fire are good, but the refining needs a flux as well. At a time when about two thousand young men are entering our technical colleges and schools of mines, with the intention of fitting themselves for a career, it is well that such profoundly sensible words should be spoken to them as these of the professor of mining in the university at Halifax. One remark appeals to us as being corroborated by all the evidence of daily observation, and that is the importance of a trained capacity for prolonged steady hard work. So many start life with a purpose, and think to achieve it by much rumination. The only sure way of reaching a destination is to persist in advancing toward it. Young men—and many who are not so very young—make up their minds to attain a goal, and then sit down to smoke a pipe until the darkness of night comes suddenly to remind them that the day of their activity is done. There is a French proverb which is usually misquoted, to the effect that "All things come to those that wait"—*Tout vient à temps pour qui sait attendre.* Everything comes in good time to him who knows how to wait, and in his waiting for opportunity trains himself into thorough preparedness, as an athlete for the race.

Professor Sexton's ideal obviously is not to prepare young men to begin life by becoming assayers or chain-bearers, merely in order that they may eventually earn big salaries. He expects to train men of a bigger caliber, with a broader purpose and a nobler ideal. Of course, at a time and in a country where the conquest of the resources of nature is part of a splendid heritage; where the iron, the granite and the copper are the strong supports of a material civilization that rises many-storied in superb arrogance; in a period when individuals win greater wealth in a year or two than was previously given to the plodding accumulation of generations—in such an atmosphere and amid such environment it is scarcely to be wondered if the prospective professional man now beginning his career is impressed with the value of money for its own sake. But we shall have our professor's support, and that of others equally observant, when we insist that the final purpose of education is not to win the skill to collect the elusive shekel, whether directly by the heavy hand of the social highwayman, or indirectly as the reward of success in art or industry. On the contrary, if the training at college, the technical preparation at the school of mines, or the apprenticeship of early years in the field itself, does not emphasize the essential common sense that man does not live by bread alone, then each of them, and all of them together, have been an irremediable failure. If the profession of mining-engineering has reached no higher philosophy than that of Wall Street and Throgmorton Avenue, it is obtuse indeed; if varied experiences, their own and others, the hardships of the trail and the luxuries of the city; the great silence of the mountains and the unresting noisiness of the streets; the poverty of the *peon* and the wealth of high finance; if all of these, in constant contrast, do not make a mining man something of a philosopher on his own account, then he is indeed as unimpressionable as the wooden Indian of the tobacconist. But mining engineers are keen observers, who have had ample opportunity to see life in its varied aspects, and they will say, at least some of the best will say to you, young man, preparing for an engineering career, that to maintain your enthusiasm for work, to possess a wide interest in men and things, to have breadth of knowledge and depth of feeling, to keep to a purpose and to own an ideal, to be a friend and a brother, to be a man and a citizen, is better than the silver of Peru or all the riches of the Rand.

WORDS AND THEIR WAYS.

There is a saying, credited to Mr. J. M. Barrie, that in this age the man of science appears to be the only one who has anything to say—and the only one who does not know how to say it. This is true in a general way, although the literary art of Huxley, Tyndall, Geikie and a very few leaders of science makes us forget the wearisome, indigestible lumps of writing which others have thrust upon a patient world as the fit expression of their observation and inquiry into natural phenomena. Whether it be true of the upper stratum of scientific thought or not, it is a statement which can be applied with greater truthfulness to that more utilitarian every-day writing in which technical men express themselves. But such dreary ineptitude is quite unnecessary; it certainly is most undesirable, as rendering unattractive those avenues of knowledge which are most immediately of service to the community. Much of the ungainliness of style and turbidity of expression common to technical literature is due to carelessness, not so much ignorance of better ways, as an idea that good literary English is out of place, and better fitted for romance, history and philosophy, if you please, than for the elucidating of the practice of mining and metallurgy, for instance.

Such a notion is comparable to that worst of

all vulgarisms which requires young people to have better manners in company than at home; or it may be likened to a cavalier who, possessing a Damascus blade of fine temper, allows it to rust when he finds that he is to use it in war instead of the tourney. It is a matter worthy of some emphasis, because it forms one of the chief obstacles to the diffusion of technical education, and contracts the sphere of usefulness open to those who grind the bread of knowledge from the harvest of fact.

These few remarks will serve as a preliminary to some distinctly commonplace suggestions in regard to two usages which, it seems to us, are open to objection. The first is the use of verbs which are compounded with prepositions, such as met with, feed in, stope up, let in, carry on, make up, come on, etc., etc. While Englishmen can fairly claim to a better use of their own language than their friends and kinsmen in America and Australia, it is a fact that in the use of these clumsy compounds they are the chief sinners. Whatever may be the value of such verb-prepositions in ordinary literature, it is certain that they tend to confusion in technical descriptions, because they are so often followed by another preposition. Thus, "One of the best mines met *with in* my travels," or "The ore is fed *in at* the curved end," or "The water turned *on at* first"; worse still, "They stoped *up in* a rich orebody," or "The timbers are let *in into* the concrete." Awkwardness is to be avoided, but beyond mere ungainliness, this usage tends to delay the reader by taking him into a verbal morass.

Another matter calls for comment—the use of the plural unnecessarily in such words as 'slime,' 'sand,' 'concentrate,' 'tailing,' 'middling.' There is no excuse for it, save bad habit. All of these words are collective nouns, which already carry a plural significance. By employing the plural, when no plural sense is involved, the writer deprives himself of this distinction when he requires it. Thus any one writing of "slimes," when only one kind of slime is under consideration, prevents himself from speaking of "slimes" when two or more varieties of slime are being described. Furthermore, the sibilant tail of the plural is awkward when compounding; slime-plant is better than "slimes-plant." It is our purpose henceforth to use the singular of all the five technical terms above quoted, except when the plural is distinctly meant. We hope our contributors will feel warranted in adopting the practice.

MARKET CONDITIONS.

Oct. 5.

The metal markets have been generally strong and show improved conditions of demand, which promise a good fall business.

Copper has been very firm. The foreign demand continues large, and domestic consumers are also taking considerable quantities, so that business has been active during the week.

Tin is quiet, but rather firm, with only moderate changes. In lead there is nothing new to report, either in demand or prices. Spelter continues at about the same level. In the Joplin market ore prices have advanced rapidly, and there seems to be some scarcity of supplies. The present situation is hardly a comfortable one for the smelters.

Silver has been fairly firm, with only slight fluctuations during the week.

The iron and steel markets generally show a rather encouraging condition. Orders are more abundant both for pig iron and for finished material, and the effect of price reductions is beginning to show in the current reports. In addition to this there are some inquiries for business running into next year. Makers are not always willing to take these at current prices, but buyers are not inclined to consider the question of an advance. Upon the whole, the trade, though still rather uneven, is in better condition and more promising than for some time.

The western coal markets show an improved demand for steam coal, while domestic orders are naturally improving with the season. The lake business is fairly steady, though some delay is being caused by congestion at the receiving ports.

The seaboard bituminous trade is still quiet, except for the slight improvement in Sound and all-rail business, while prices for the lower grades are a trifle stronger.

The anthracite trade has shown no marked improvement, warmer weather influencing buying. The steam sizes are in slightly better demand.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Progress in knowledge implies its reduction to a more exact form and the expression of its ideas in language more or less mathematical.

The duration of an earthquake is brief; it is generally a matter of seconds rather than minutes. A great number of recorded observations show that the average duration is forty-five seconds.

The census of British South Africa, including Cape Colony, the Transvaal, Natal, Rhodesia, Orangia, Basutoland and Bechuanaland, gives the white population at 1,135,016, and the colored at 5,198,175.

The mineral chalmersite has so far been found only in the Morro Velho mine, of Brazil. It is a yellow metallic substance, of the formula $CuFe_2S_4$, being isomorphous with copper glance. It is named after Mr. G. Chalmers, the superintendent of the Morro Velho mine.

Zircon, the silicate of zirconium, is valuable for gem purposes when transparent, while the opaque variety finds application in the manufacture of the glower for the Nernst electric lamp. There is only one deposit in this country that is worked, situated in Henderson county, North Carolina.

Two-thirds of the 181,579 long tons of asphaltum imported into the United States last year came from Trinidad.

During the first half of the last century earthquakes were explained by three different theories. First, they were attributed to sudden downthrows or collapses of the ground; second, to volcanic action; third, to the action of a liquid interior of the earth upon an external rocky crust under the disturbing influence of tidal forces. All these theories have their advocates to-day.

A recent theory to explain earthquakes is that of 'earth stress.' It is believed that if the earth is cooling, then there must be a strain between the outside crust and the hotter interior. One idea advanced by Babbage and Herschel is what might be designated as the balance system. Somewhat crudely explained, it would mean that as the higher elevations are carried downward to the plains, there may arise a want of equilibrium. Denudation is followed by sedimentation. On the bottom of the ocean may be found the sands derived from the grinding away of the lofty mountain peaks. The transmitting power has been the rain or the melted snow and the rivers. In time there is more weight on the ocean bottom than it can bear. Then there are sea bottom upheavals or depressions, and the agitation is transmitted to the solid earth.

The literature of the world is full of prophecies which have come true, and it is an amusing task to classify them. There are those anticipations which are no prophecies, but are the dim reports of obscure facts. When Lucian, in his 'Vera Historia,' describes with great accuracy the kangaroo, he is probably not inventing or prophesying, but giving the wild tale of some forgotten adventurer. So also with Herodotus's account of Central African pigmies, or Ptolemy's description of equatorial snow ranges.

A striking instance of prophesy by confidence in symmetry was the performance of the Russian Mendeléjeff about 1870. It suddenly occurred to him to range the 63 known elements in rows, seven deep by twelve, in order of their atomic weights, leaving a certain number of blanks. Then it seemed to him that his ranks grouped themselves into family parties, which he proceeded to adjust by denying the atomic weights of some of the elements which proved refractory. He invented elements to fill the vacant niches, giving them weights and qualities according to his family theory; and lo and behold! in the last thirty years nearly all his wild prophecies have been proved correct. Although buttressed by vast knowledge, yet his results, as Mr. Rogers says, "were ultimately derived from a childlike belief in symmetry, diversified by an equally childlike belief in what I call alternate correspondence." There is one final form of "intelligent anticipation," where an inquirer sees the end of his inquiry by a kind of imaginative insight, and takes a short cut to get to it, anticipating the result of the last few stages. Such an act is not only justifiable, but inevitable, for to any man who has long centred his mind on one subject, the end must become a certainty long before the last stages of ratiocination are complete. In throwing his mind forward he adopts a course which in itself is strictly scientific.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of THE ENGINEERING AND MINING JOURNAL.

THE BUSS CONCENTRATING TABLE.

The Editor:

Sir—In your issue of August 4, 1904, appeared a description of the Buss concentrating table, whose chief feature is that its motion imitates the action of the Cornish vanning shovel.

The application of the oblique reciprocating movement to ore-separating tables belongs not to Mr. J. Buss, but to me. I applied for a German patent on this kind of table October 24, 1898, and for a British patent October 31, 1898. I filed my application in the United States December 5, 1898, while Mr. Buss did not apply for his until February 12, 1900.

Moreover, the Buss patent relates only to the means for tilting the table longitudinally, and not at all to the upward oblique, reciprocating movement. My first concentrating table, which was fitted with four adjustable supports arranged in pairs (just as is described in the claims of the American patent of Mr. Buss, No. 657,393, of date September 12, 1900) was sent to England in the spring of 1898, and it was used in 1898 in the dressing works of the Frongoch mine, Cardiganshire. These tables are now in use all over Europe, where they compete advantageously with every other kind of concentrating apparatus. The well-known Grusonwerk, of Magdeburg, now controls this table and the patents on it.

E. FERRARIS,
Manager of the Societa di Monteponi,
Sardinia, Italy.

Monteponi, Sept. 20, 1904.

DREDGING COSTS.

The Editor:

Sir—In your issue of September 15 we note an editorial giving costs of gold dredging at Oroville. Having recently had occasion to investigate this matter, we take the liberty of questioning the accuracy of the figures given.

The cost per yard, 4.88c., is below the general experience of this district. Seven cents per yard would be much nearer the actual operating expense of the 5-ft. dredges now in use. The last company to invade this field, guided by the previous results obtained, have allowed 8c. per yard to cover operating expense and depreciation, the latter item being estimated at about one cent per yard.

The statement of 23,995 kw. hours per month is less than half of any figures that have heretofore come to light. Labor at $496 per month is also much below the best results so far obtained. There are several instances where dredges have been operated for a month or more at a cost less than 4c. per yard, but estimates of costs, yardage, etc., from periods of one month are entirely misleading. Repair expenses range from one-quarter to one-half the total cost of operations, and for many months they may be comparatively small. This, of course, will give a large yardage and low monthly expense. Consequently the cost per yard will be much below the normal. On the other hand, a month when much repairing and renewal of dredge parts took place will give a low yardage and a high monthly operating expense, giving costs per yard much above the average.

One dredge at Oroville ran continuously for eight months, making a splendid record, and then shut down 39 days for repairs. The fact, therefore, is obvious that costs per yard are only reliable when periods of a year or more are considered.

The present tendency is to increase the size of the buckets and the strength of the wearing parts. This increases the yardage, with practically the same labor charge, and a less than proportional increase in the expense for power and repairs. It is expected that the improved dredges capable of handling 80,000 cu. yd. and upwards per month will reduce the costs to 5c., and lower, per yard, but this cannot be done with dredges having a capacity of only 46,000 yards per month.

Yours respectfully,
STEBBINS & SMITH.

San Francisco, Sept. 22, 1904.

[This criticism is made fairly and with some reason. We can quote average costs and yield for a well-known dredging company at Oroville, which has been in operation for 5 years. The average cost for each year has ranged between 4.92c. and 7.47c., averaging 6c. for the whole period; the yield has averaged 13c. per yard.—EDITOR.]

BRIQUETTING OF COAL.

The Editor:

Sir—You will perhaps be aware that there is a great interest being taken at the present time in the United States in the briquetting of various kinds of coal, etc., and a few hints on the practical and fundamental principles of briquetting will no doubt interest some of the subscribers of your valuable JOURNAL. I propose to enumerate the various points in detail.

1. The art of briquetting is in the preparation of the materials under treatment, and when the disproportion between the amount of coal to be briquetted and the binder is considered, say 90 per cent of coal against 10 per cent of binder, you will realize that the mixing of the two together must be of a thorough and drastic nature.

2. I do not propose to give any opinion on the various binders that are on the market, but to give a practical explanation of the action and result that any binder must give before the coal can be successfully made into a commercial briquette. As I have already intimated, the preparation must be thorough and the binder must contain a certain proportion of refractory matter that will flux by heat, and the coal and binder must, after being carefully proportioned and mixed together, be ground to a fineness of not less than 80-mesh. It must be then treated in a steam-heated mixer, or cooker, and, while being agitated by revolving knives, subjected to the action of live or superheated steam, at a heat not less than 180° F. This reduces the pitch and volatile matter in the coal into a semi-plastic state, and the artificial binder, as already intimated, will blend and flux with the coal. It must then be taken, while in its heated state, and passed into a mould and subjected to a pressure on both sides simultaneously not less than 1.5 tons to the square inch. By this preparation the briquette is made into a homogeneous and concrete mass, which makes it practically impervious to the weather, and prevents disintegration.

3. Care should be taken in selecting a binder, other than pitch, that will burn at the same, or slightly slower, rate than the natural coal, as the vital principle of briquetting is to make the briquette coke, and burn all round, and not disintegrate, while under fire.

4. In giving an exposition on the difference in the heating power between lump coal and briquettes made from fine coal or slack, it must be understood that all comparisons are based on the assumption that the fixed carbon and volatile matter be of the same proportions, and the slack and fine coal free from dirt and foreign matter. In taking the analysis of any coal and comparing the amount of steam generated or water evaporated in proportion to the amount of fixed carbon and volatile matter it contains, it is disappointing; and the reason is that, owing to the high proportion of volatile matter and the naturally friable nature and formation of the coal, when it comes in contact with live fire, it disintegrates more or less, and a large proportion of its valuable properties become what is known as smoke. But with any coal treated on the principles I have enumerated, the result will be that by the blending and fluxing of the artificial binder with the volatile matter and the carbon, the whole of the combustible matter in the coal is reduced to a semi-plastic state, and when the briquette is cool it resembles the heart of a vitrified brick, and the combustion is more uniform; the volatile matter only burns at the same rate as the carbon, and the result is that a higher calorific action takes place, because the carbon and volatile matter are consumed while in the fire, with the result that, compared by tonnage, the briquette will generate more steam and give off less smoke.

In conclusion, coal briquetted on this system will stand the weather for years and does not deteriorate as natural coal does.

HENRY WOODHEAD.

World's Fair, St. Louis, Sept. 27, 1904.

The weight of portland cement concrete varies from 130 to 140 lb. per cu. ft., according to the proportion of rock used and the specific gravity of the rock.

A true portland cement is classed as slow-setting when a cake of the neat cement takes over half an hour to harden sufficiently to resist the impression of the finger nail. The addition of sand increases the slowness of setting.

There is still good reason to think that earthquakes are more or less associated with volcanic action, but not so universally as was before imagined. According to the seismologists, the earthquake due to a volcano is seldom felt at any great distance from its epicenter. This is accounted for in this way: The force which starts it is not a deep one. The earthquake of Casamilliola of 1833 was a fearful one from the loss of life, yet the shock of it was barely appreciable at Naples, only twenty-two miles distant. The delicate instruments on Mount Vesuvius showed no record of it. The eruptions of Mont Pelée and La Soufrière gave "rise to no far-reaching shocks or vibrations." The eruption of Krakatoa (1883), when one-half of the island was scattered into almost impalpable fragments, gave out but imperceptible vibrations at Batavia, only ninety miles distant. The only evidence of this awful cataclysm was a far-extending sea wave. Around Vesuvius many smaller earthquakes occur, which are seldom felt in Sicily or on the Italian coast.

A MONONGAHELA RIVER MINE.

At Bridgeport, just south of Brownsville, Pa., on the east bank of the Monongahela river, the River Coal Company, a corporation said to be affiliated with the W. C. Frick Coke Company, is opening a new mine to work the Pittsburg seam. This seam is here about 8 ft. thick, and has a gentle dip to the west, the mine being on the east side of the axis of the Brownsville syncline. The company controls a large acreage underlaid by the coal in the hills to the east, and the plant now nearing completion will be one of the largest on the Monongahela river, the designed capacity of the tipple being 3,000 tons (1,200 mine cars) in an eight-hour day. The mine is on what is known as the Fourth Pool, but will be on the Fifth Pool as soon as the new dam below Brownsville is completed. The tipple is supported by piers resting on concrete foundations sunk to bed-rock, and was built by the Shifler works of the American Bridge Company.

A large building, about 110 by 50 ft. in size, is divided by fireproof walls into a boiler-house 50 by 50 ft., a dynamo room 35 by 50 ft., and a machine shop 25 by 50 ft. In the boiler-room are eight Erie Iron Works water-tube boilers of 200 h.p. each, and a feed-water heater 9 ft. high and 4 ft. in diameter, made by the Pittsburg Feed-Water Heater Company. The boiler feed-pump is a Yough. In the dynamo room are two Erie City 20 by 21-in. high-speed engines, each directly connected to a Westinghouse direct current 200-kw. generator, giving a current of 550 volts at 200 revolutions per minute. The room also contains a Westinghouse standard 7½ by 7-in. engine, driving a 20-kw. Westinghouse direct current generator for lighting, in case of an emergency, and a fine five-panel switchboard.

At the river end of the tipple the company has dredged a boat yard, protected by piling. As befits a new mine of this size, all improvements are of substantial construction. The tipple is of steel, the boiler-house, engine-house and carpenter and blacksmith shops have concrete floors, brick walls and wood and slate roofs supported on steel trusses. Liberal use is made of concrete for machinery foundations and for the mine entrances.

The great steel tipple, 750 ft. long, spans the tracks of the Monongahela division of the Pennsylvania railroad. It has two Phillips cross-over dumps, and the screens and chutes are arranged to permit of shipments by rail or river. There are four tracks on the tipple, two for loads and two for empties. Chain car hauls, of Heyl & Patterson make, elevate the cars so that their subsequent movements about the tipple are by gravity.

The company has sunk in the river bank a dry well 16 ft. in diameter and 30 ft. deep. In this well is an electrically driven Stilwell-Bierce & Smith-Vaile triplex pump, with 12 by 12-in. cylinders, that draws from the river, through a 20-in. suction pipe, all the water needed for the use of the plant and for fire protection. The driving head of the pump is at the top of the well, connected by rods with the cylinders at the bottom. The water is forced to a tank holding about 5,500 gal., situated at an elevation of about 200 ft. on the hill east of the mine. This gives a pressure of 75 lb. for all ordinary use, but in case of fire the gate-valve to the reservoir will be closed, and the pump will work directly against the fire plugs.

The newly-opened mine will be electrically equipped throughout. Jeffrey chain machines will undercut the coal. No mules will be employed for haulage, as the electric locomotives will run into the rooms. As the coal dips toward the shaft, little trouble is expected in draining the workings. Any little hollows or 'swamps' crossing the workings will be drained by small electric pumps. A large steam-pump is situated at the bottom of the shaft. The mine cars used are of wood, with iron draw-bars, and self-oiling wheels and axles. They are 54 in. high from the rail to the top of the front gate, and hold about 2.5 tons.

At the mouth of the air-shaft is a fan-house containing one of the biggest Capell fans in this country. This fan, designed by W. Clifford, of Jeanette, Pa., is 24 ft. in diameter and 8 ft. wide. It is driven by a 14 by 18-in. Harrisburg engine, and is a volume rather than a pressure fan, the mine openings being of large section. It passes about 280,000 ft. of air per minute at 1.5 in. water gauge. In laying out the mine openings care was taken to have the engine-house near the boiler-house, and as a result the steam-main to the fan-engine is less than 100 ft. long.

Other surface buildings are an engine-house, 25 by 40 ft., containing a first-motion hoisting engine, with duplex cylinders 24 by 36 in., made by the Franklin Iron Works, of Port Carbon, Pa., and a carpenter and blacksmith shop 30 by 40 ft.

The mine openings are three—a main hoisting shaft, of semi-elliptical section, 76 ft. deep, an air-shaft of rectangular section, 10 by 12 ft., and a slope for men, mules, timber and other supplies. The main shaft is remarkable in several ways. It is the only mine shaft of similar section in this country, the section, a compromise between a circle and a rectangle, representing a compromise in the views of the engineering staff. There are really no buntons in the shaft, though steel beams were put in after the shaft was completed to hold the guides in place. The shaft lining is of concrete, and this concrete work was done while the shaft was being sunk. A coffer-dam was built and an inside and outside form were made after the excavation was down about 15 ft. Then the space between the forms was filled with concrete, and when the concrete hardened the shaft lining was slowly sunk by removing dirt from below and adding more concrete on top.

The shaft is 10 by 23 ft. in dimensions inside the corners, the sides and ends being segments of circles. It is divided into two hoisting ways and an air-way. The cages will hoist one car at a time, and the total lift from the shaft bottom to the tipple floor is about 100 ft.

The air-shaft is also lined with concrete. The slope, which is 320 ft. long, has a grade of about 25 per cent. It has an arched roof of 10 ft. span and 10 ft. radius. The concrete lining is 179 ft. long, 12 in. thick on the walls and 15 in. on the arch. There is a wide concrete arch over the main road. This opening for 100 ft. is 12 ft. high and 17 ft. wide in the clear. The concrete is 12 in. thick on the side and 15 in. on the arch.

The grade on the main haulage road to the shaft bottom is 0.5 per cent, and the 20-ton electric motors will haul trips of 50 cars. The empties will run from the cage to a chain haul that will elevate them about 12 ft., and they will then run to an empty siding about 500 ft. long.

The mine, like practically all those working the Pittsburg seam, is being opened on the room-and-pillar system, and is being laid out in blocks or panels of 30 rooms each. Butt headings and accompanying air-ways are driven, with a 30-ft. pillar between, at 350-ft. intervals, leaving a 50-ft. pillar along the faces of the rooms. The rooms are all turned either to the right or to the left, according to the pitch. The room openings are 7 ft. wide, and the rooms gain their full width at 30 ft. in.

Great care is taken to keep the ventilation good; all stoppings are of concrete, and the bottoms of overcasts are of steel beams and concrete. It is not thought that the workings will be gaseous, and, consequently, doors will not be needed to ventilate rooms or headings. Not a single door will be used to separate main air currents.

MINING ON THE GOLD COAST IN 1903.

The report of the governor of the Gold Coast for 1903, recently issued by the British Colonial Office, indicates that the mining industry of that country is gradually emerging from the stock market, or speculative, stage into the period of actual development. The production of gold last year was the largest recorded in a long time, the exports amounting to £254,790 or 59,981 oz. fine. This total is about equivalent to the aggregate exports for the five preceding years. As in the previous year, nearly the whole output of gold for 1903 was won by the Ashanti Goldfields Corporation, at Obuassi, and by its subsidiary mine, the Ashanti Sansu, which together exported 63,767 oz., valued at £229,363. The Bibiani Goldfields, which made its first shipment in December, 1902, during the year under review exported 6,825 oz., valued at £24,572. The Ankobra, Tarquah & Abosso Development Syndicate exported 137 oz., valued at £493, and the Gold Coast Exploration & Trading Company shipped 33 oz., valued at £120. This last item includes 27 oz. of nuggets found while prospecting in eastern Akim.

Although the production of gold made a satisfactory advance during the year, the general status of the mining industry did not show any great improvement. Only three companies contributed materially to the output. In the western province of the colony, in which the properties of most of the principal companies are situated, three batteries were working at the close of the year, including those of the Bibiani Goldfields, Ltd., the Broomassie Gold Mining Company, Ltd., and the Adjah Bippo Gold Mining Company, Ltd. The Ankobra, Tarquah & Abosso Development Syndicate, Ltd., is dredging in the Ankobra river. Eighteen companies were engaged on work of development, nine in prospecting and two in cutting boundaries. During the year six of the companies closed down.

In Ashanti development work is in progress on the following properties: Edubia Syndicate, Ltd., Akriporisu (Ashanti) Syndicate, Ltd., Bipposu Mines, Ltd., Consolidated Goldfields of Ashanti, Ltd., Akrokerri (Ashanti) Mines, Ltd., Ashanti Goldfields Auxiliary, Ltd., and Obenemassi Mines, Ltd. The work of the Offin River Gold Estate, Ltd., has been confined to reef prospecting and the erection of a dredger, which was reported in December, 1903, to be ready to start work early in January, 1904. Nine concessions were abandoned and eighteen became void on account of non-payment of rent in Ashanti during the year. Some prospecting work has been carried out in connection with concessions taken up in the

Northern Territories. The health of the Europeans employed by the various companies in the colony and Ashanti has been good.

The Government Railway to Kumasi, which was to be opened early in 1904, will assist the companies to get heavier stamps on to their properties, and considerable progress should be made during the year.

CHROME ORE SUPPLIES.

The rapid expansion of the chrome ore industry of New Caledonia recently has begun to have a very noticeable influence upon the general trade conditions. In fact, the competition from this source has become so sharp that some apprehension is felt that it may seriously affect the industry in other countries. So far, the most important result connected with the increased exports from New Caledonia has been a decline in the quotations of about $5 per ton for 50 per cent ore at New York.

For many years the trade in chrome ore has been practically controlled by the Turkish producers. The exports from this country have averaged 40,000 tons annually, which up to 1903 about equalled the aggregate output from all other countries. The mines are situated in the European provinces of Salonica, Kossovo and Monastir, and the Asiatic provinces of Aidin, Konia, Adana, Angora, Broussa and Macri. Most of the product imported into the United States comes from Macri and Broussa, and is known under the trade names of "Macri" and "Daghardi," the latter being the largest mine in Broussa. The ores range in content of chromic oxide Cr_2O_3 from 48 to 54 per cent; the Macri ore carries from 48 to 51 per cent and the Daghardi ore up to 54 per cent. There has been some effort put forth to restrict the output within reasonable bounds, as the resources of the country are very extensive and could be made to yield much more than the present output. The Turkish government exacts a royalty of 20 per cent on the value of the ore mined and also imposes a duty of one per cent on the exports. In spite of this heavy burden, however, the cost of producing the Macri ore and delivering it at the seaboard is said to be only $8.75 per ton.

The growing importance of New Caledonia as a producer of chrome ore is well shown by the statistics of exports, which have increased from 1,042 metric tons in 1894 to 10,474 tons in 1900, and 21,437 tons in 1903. During the first four months of the present year the shipments amounted to 12,225 metric tons. The chromite is mined principally in the northwestern and southwestern portions of the island, the mineral occurring in association with serpentine, which also yields the nickel and cobalt ores. Some of the deposits are of great size; as much as 20,000 tons of ore have been taken from a single orebody. The principal factor in the industry is the Société le Chrome, a combination of producing interests which came into existence in 1902. At present mining is most actively carried on at Tiepaghi, where the ore is especially rich. The Société le Chrome has leased the mining rights on this property to tributers, who paid the sum of $200,000 for the privilege of working it for three years. It is said that the output for this period may reach 100,000 tons. The ore requires no mechanical concentration, and is shipped in large lots with an average content of 56 per cent chromic oxide.

Aside from Turkey and New Caledonia, chromite is mined quite extensively in Canada, Newfoundland, Greece, Russia, India, and Australia. The deposits in the United States are of small importance at present, although they occur quite widely among the altered rocks of the Appalachians from Pennsylvania southward, and also in California. In recent years the output has amounted to only a few hundred tons, most of which was mined in California and consumed locally. As to the other countries, Australia has come into some prominence lately, due to the fact that the ore is high grade and is exported to the United States as ballast in wool-laden ships, thus getting a very low transport rate. Important discoveries of ore have recently been reported from India, and it is now being offered in the American market. The Canadian chromite is obtained from the eastern townships of Quebec. According to J. Obalski, a good deal of development has been done lately, and an increased output may be expected from this region. The production in 1903 amounted to 3,020 tons. Newfoundland is known to possess large deposits of concentrating ore, favorably situated as to transport, but so far they have not been very actively exploited.

The consumption of chromite in the United States at present is probably about 30,000 long tons per annum. The imports for the last three years have been as follows: 1901, 20,112 tons; 1902, 39,570 tons; 1903, 22,931 tons. There are three important applications to which the ore is put: the preparation of bichromates and other chemical compounds of chromium, the manufacture of ferro-chromium, and in making linings for blasts and reverberatory furnaces. For the latter purpose it is sometimes used in the form of bricks. The Kalion Chemical Company, of Philadelphia, Pa., controls the manufacturing business in chromium compounds, while the Wilson Aluminum Company, of New York, is the principal manufacturer in this country of ferro-chrome. Chrome bricks are made by the Harbison-Walker Company, of Pittsburg, Pa.

The present quotations for chrome ore at New York are $19 to $19.50 per long ton, on the basis of 50 per cent chromic oxide. A premium of $0.40 is allowed for each unit above that limit. It remains to be seen whether the present prices, which are below the normal of previous years, will stimulate the consumption sufficiently to maintain a balance with the rapidly increasing production.

PIG IRON PRODUCTION IN BELGIUM.—The production of pig-iron from Belgium blast furnaces during the eight months ending with August last comprised 162,637 tons of forge pig, 70,450 tons of foundry pig, and 638,301 tons of pig for making steel—a total of 871,388 tons, which compares with 861,150 tons in the corresponding eight months of 1903.

IRON ORE IN BELGIUM.—The imports of foreign iron ore into Belgium during the eight months ending with August last reached a total of 2,272,996 tons, as compared with 2,112,122 tons in the corresponding period of last year. There has also been an increase in the exports in Belgian iron ore—from 280,138 tons in the first eight months of 1903 to 314,212 tons this year.

BREADTH OF TRAINING.*

By F. H. Sexton.

In technical teaching one must keep in mind that it is chiefly the training, not the knowledge attained, that is of value. The mere facts that the man memorizes are not the essentials. The power to discriminate between important and unimportant things, the habit of conquering unfamiliar and apparently insurmountable difficulties independently, by methods of repeated trial and rejection, the real appreciation of the care and patience absolutely necessary for the working out of any problem—these are some of the essential things in the technical education. It is to be the aim of the mining department in this college to inculcate these things in students. We shall teach men the theory and best practice in mining and make them thoroughly familiar with the rapid commercial methods of analysis and assay. We shall acquaint them with common practical mining and concentrating machinery by constant use in their last year, and, as far as may be possible, give them the ability to work persistently, intelligently and honestly. We shall try hard to make a man learn to use his own hands. It does not hurt him at all, and at some time in his life, if he knows how to handle a lathe, connect a motor, or make a good, clean mortise; it will mean the ability to overcome a crisis. We shall teach the qualities of alertness, perfect honesty, ability for research, independence of thought, correctness and keenness of observation, and, lastly, a capacity for hard work. I firmly believe that the capacity for prolonged steady hard work is the most important of all. There are a goodly number of brilliant men, but comparatively few men possess tenacity of purpose. The larger number of the greatest men owe their positions to persistent application to one thing more than to any other cause.

To summarize and condense what I have tried to elaborate: The purpose of the college is to fit a man to start real life well. He should have the ability to observe squarely and keenly, to reason dispassionately, to love and appreciate the construction of great schemes of engineering. These he should obtain from his scientific training. From his arts training he should have wide interests, some degree of culture, some philosophy of life. The college man should be ready to start with a broad, vigorous mind, a strong, healthy body, and a zest for work and life. He should be ready to take his place in the world as an independent unit, but the broadening of himself must not stop at the moment of receiving his degree, for at this point he stands simply upon the threshold of accomplishment. To win the high place for which his college has well started him he must possess some general characteristics, either natural or acquired.

He should have enthusiasm, and this I consider one of the most important qualifications. It means a keen joy in things, and especially in the thing he is doing. It is not enough for a man to do his work calmly and deliberately. A man who has won a high place in business and also in science said to me when I had been out of college a year: "If you can only keep up the enthusiasm that you have now, I can unqualifiedly predict your success simply from one quality." You cannot realize how hard it is to preserve this enthusiasm until you have tried. It means getting up each morning with

*Abstract of address by Mr. F. H. Sexton, professor of mining and metallurgy, at Dalhousie University, Halifax, September 14, 1904.

the feeling that this is a new day, full of new opportunity, that the unrequited struggle and discouragements of yesterday are but ancient history.

He should have a definite curiosity to know about everything that comes in his way. He should listen appreciatively, should look with eyes that see, and see not vaguely, but accurately. It is appalling how stupid and ignorant we are about the things that are right around us. How many of us can explain clearly and accurately the true working of a watch or clock, or know why bodies of fresh water do not freeze solid to the bottom, or can tell the difference in principle and operation between an incandescent lamp and an arc lamp. Perhaps these particular things most of you do know, because they are more or less familiar, or should be, to the college student. I have, however, put the question to a goodly number of people in this city, who could not tell me the exact difference and significance of the various uniforms and paraphernalia of the English soldiers stationed here. These may seem to you all very small things to know, and they may be in themselves, but I wish simply to show that we do not regard with interest just the common every-day things about us. It is the enthusiastic, progressive man that never lets slip with indifference an opportunity to glean information, who is the kingpin in a crisis. The information which seemed insignificant when it was gleaned is just exactly the information needed at the crucial moment.

A young man should have energy and the power of concentration. These qualities enable him to keep hammering at things until he masters them. They enable him to rise to an occasion that demands his best.

He must not be a man of petty things. He must clear away the unimportant part of a new problem and get right at the gist of it. I know a man who is extremely clever, possesses a deep, wide scientific knowledge, is a good experimenter, and has a shrewd head, but is doomed to partial failure because he cannot see a new problem in its wholeness, and stumbles along among the subordinate conditions until he is lost in a maze of detail.

After all and above all, the man must have breadth of knowledge and feeling. Unless he has this he cannot meet and handle men, and without this ability he will not win his high place among them. Except for a few vocations, as I have said before, he needs both scientific and arts training while in college, and it seems to me that he can get the firm foundation in the technical courses, and the necessary broadening in the arts courses. He must not become too broad, or he will lose directive force altogether, and be like a river uselessly spread over a waste plain, instead of a well-directed irrigating canal. He should be broad enough in feeling to sympathize with the musician, the poet and the day laborer, no less a span than that. Unless the men that he abrades in social contact feel his kinship definitely, he will have no influence upon them. He must be a man, a true, fine, broad man. His knowledge, sympathy, fineness, kindness, must be felt in his hand-clasp and in his straightforward glance. It should be said of him as Kipling says in 'Things and the Man':

> "He locked the ranks, he launched the van
> Straight at the grinning teeth of things
> He led his soul, his cause, his clan,
> A little from the ruck of things."

THE ZINC ORES OF VIRGINIA.

By C. O. Payne.

As an interesting contribution to the theory of the origin of the silico-carbonate zinc ores of Virginia, and of similar ores elsewhere, the suggestion made by Mr. W. H. Seamon, in 1890, seems to me to be worthy of more careful attention than it has yet received.[1] In a study of the zinciferous clays of southwest Missouri, Mr. Seamon concluded that all the massive calamine once existed in the form of zinc clay, called 'buck-fat' in Virginia, and 'tallow-clay' in Missouri, being formed by precipitation from the reaction of zinc sulphide with hot silicious waters. By subsequent filtration of waters, the zinc silicate has been, and is still, gradually being removed from the zinc clay and crystallized as calamine, the residual clay, which are called 'joint clays' in Missouri, being much lower in zinc and higher in iron than the 'tallow-clays.'

This theory seems to account adequately for the fact that the calamine is found under the clay covering, in contact with the limestone, and that the limestone itself may be barren of zinc blende, as is usually the case; the silico-carbonate ore having been derived from the weathering of zinc-bearing strata of a higher level.

Whatever their origin, however, one of the most interesting as well as difficult problems remaining to be solved in connection with the treatment of the Virginia zinc ores is the question of the recovery of the zinc contained in the zinc-bearing clay. While the percentage of zinc contained varies quite widely, yet for practical purposes it may be assumed to average about 20 per cent, after drying at 212° F. This amount of zinc being too low to enable the material to be charged directly into the zinc retorts for the production of spelter, the scheme of treatment heretofore employed, both at the dressing mill at Austinville, and also at the old Bertha mill, consisted in concentrating the calamine by jigging out the 'buck-fat' as tailing. The Austinville mill, being situated close to the river upon sloping ground, no site was available for impounding the tailing, and it has been continuously discharged into the river, whereby thousands of tons of zinc have been placed beyond recovery. When the mill of the Bertha Mineral Company, at Bertha, was in operation, the same disposition was made of the zinc clay, although here a somewhat more favorable site permitted the formation of a slime-pond, close to the river, wherein a certain amount of tailing, estimated at about 50,000 tons, has been retained. Upon this tailing most careful experiments by gravity methods of slime treatment have failed to show any appreciable concentration of the zinc. It has also been suggested that it might be utilized in the production of zinc-oxide, previous to its conversion into spelter. It must be remembered, however, that the zinc clay is never found in association with zinc-blende, and that with the exhaustion of the silico-carbonate ore, and the exploiting of the underlying zinc-blende ore, the necessity for an intermediate process for utilization of the zinc clay, by the production of oxide, will then cease.

In some tests made by me in 1898 on this zinc slime, it was found that by drying and calcination the zinc content of the slime could be raised to about 25 per cent. The iron was found to average about 7—9 per cent, and the results indicated that with fine sizing, and the use of magnetic separators especially designed for such fine material, the clay particles could be classified by their iron content to an appreciable extent, and the zinc in the concentrate thus brought up to about 32 or 35 per cent, with a reduction of the iron down to 2 or 4 per cent, the clay particles of the slime high in iron and low in zinc forming the tailing.

To utilize such zinc concentrates for the direct production of spelter would, of course, require the admixture of still richer zinc ores before charging them into the retort. While magnetic treatment of the clay slime cannot hold out hope of a higher efficiency of recovery than 50 to 60 per cent of the total zinc present, yet to that extent it is an obvious advance over gravity methods of treatment, which render none of the zinc in the slime available for furnace use. The solution of this problem will probably turn upon the relative quantity of zinc-bearing clay which remains in a given mine in association with the silico-carbonate ore. When some approximate idea of their quantity is determined, it will then be possible to ascertain whether the higher cost of treatment and higher percentage of recovery of the furnace method of treating the zinc slime will afford a greater commercial return than the lower cost of magnetic treatment, with also a lower percentage of recovery of the zinc present.

Considering the Virginia zinc field in general, it is evident that while neither the magnitude of the present mining operations merits special attention, nor the richness of the ores produced from its mines, yet there are a number of circumstances which tell in favor of the mines of this region. A demand exists for the highest grade of spelter made from the pure crystallized calamine ore of the Bertha mine, which has established the highest reputation for the exceptional purity of its spelter, both at home and abroad, as well as for certain desirable qualities in casting, which do not seem to be obtainable in spelter made from sulphide ores. Moreover, the ores can be mined cheaply, fuel is close at hand and cheap, and labor is also cheap and abundant. The low grade of the zinc ore can be largely remedied by magnetic separation, which will always be necessary in order to secure a high retort efficiency for this ore.

In the three-cornered adjustment of assembling the ore and fuel and of supplying the market, it is believed that the favorable underlying conditions will enable the Virginia zinc district to continue to meet successfully the competition of the other zinc-producing centers of this country.

[1] *The American Journal of Science*, Vol. XXXIX, p. 38.

CEMENT IMPORTS.—Imports of cement into the United States for the eight months ending August 31 were 121,337 short tons, against 348,069 tons in the corresponding period in 1903, showing a decrease of 226,732 tons, or 65.2 per cent. The principal items this year were 64,218 tons from Germany, 46,469 tons from Belgium, and 5,267 tons from France.

DIAMOND IMPORTS.—Imports of diamonds into the United States for the eight months ending with August were valued as follows: Uncut, $6,195,870; cut, but not set, $7,461,344; total, $13,657,214, a decrease of $4,503,727 from 1903. The totals include diamonds for industrial uses; but in addition, diamond dust, or bort, valued at $442,984, was imported this year.

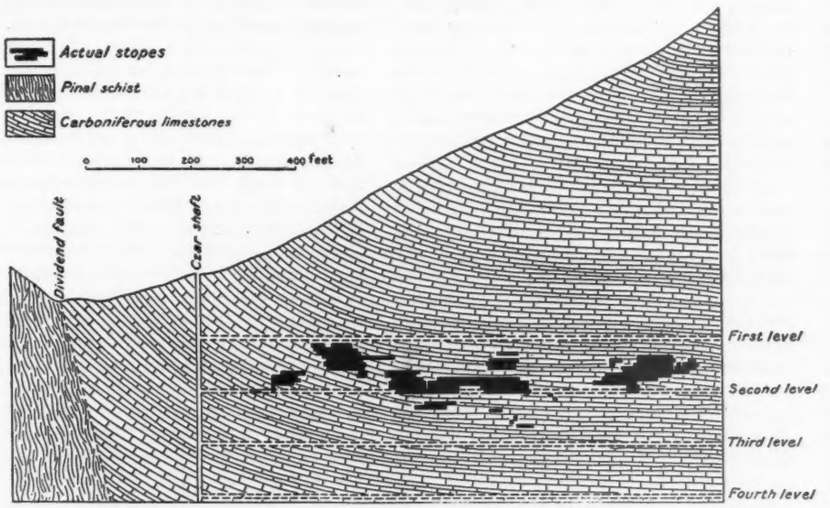
THE WARREN DISTRICT, ARIZONA.

EDITORIAL CORRESPONDENCE.

With a long and successful career behind it, Bisbee is only now entering upon the stage of development and expansion commensurate with its resources. Until recently the history of the Copper Queen mine, which extends back for nearly twenty-five years, practically covered the whole record of Bisbee as a producer of copper. The opening of the Calumet & Arizona mine, the construction of El Paso & Southwestern railroad and the erection of the great smelting plant at Douglas, within the last three years, have transformed Bisbee, however, into one of the largest copper mining camps in the United States. In 1902 the output amounted to 37,900,000 lb., while it increased to 61,400,000 lb. in 1903, and will show a further important gain during the present year. It is worthy of note that among the ten largest copper mines in the world, as measured by the relative production figures for 1903, both the Copper Queen and the Calumet & Arizona find a place.

Besides the two productive mines mentioned there are a number of properties on which exploratory work is being done. The remarkable success attained by the Calumet & Arizona company has attracted more new capital to Bisbee than probably has been spent recently for exploration in all other districts of the Territory combined. Many of the enterprises thus far have failed to find anything promising, a result that is not surprising when it is considered that exploration has been carried on over a wide area, and, in not a few cases, without apparent reference to the geological conditions under which the orebodies occur. Some of the more favorably situated properties are showing up well and warrant the expectation that they will become good mines. The prospect for a continued expansion of mining in the district therefore seems assured.

In its general features Bisbee exhibits many points of contrast with the other camps in this region. To one who has visited the districts of Globe and Clifton, where the outcropping rusty quartz veins are so conspicuous and so intimately associated with underlying orebodies, the almost complete absence of surface indications pointing to the great deposits at Bisbee is most striking. An open cut at the center of the town marks the only outcrop of ore that has been found, and it was here that the first mining was done. This deposit, according to Mr. James Douglas, measured 60 by 60 ft. in cross-section. It supplied the original smelter for a period of three years, yielding in all about 20,000,000 lb. copper.



GENERALIZED SECTION THROUGH CZAR SHAFT, COPPER QUEEN MINE.
Showing Form and Relation of Orebodies. After Ransome.

The ore-bearing zone, as shown by present developments, underlies an elongated area, which extends from Bisbee southeastward for a proved distance of nearly two miles. It has the form of a broad curve, opening to the southwest and following quite closely the base of the adjoining ridge. Within the northern section of this crescent are situated the older workings of the Copper Queen Company, while in the southern part are the more recently opened properties, including the Calumet & Arizona, Calumet & Pittsburg, Lake Superior & Pittsburg, Pittsburg & Duluth, and others, locally known as the "bonanza group." The Lowell mine, owned by the Copper Queen Company, also belongs to the latter group, having being brought to the productive stage within the last three years. Its shaft is about a mile southeast of the smelter, midway between the Calumet & Arizona and the Calumet & Pittsburg openings.

The orebodies are found as irregular masses in Carboniferous limestones. The latter outcrop in great force on the ridge south of Bisbee and west of the mines, and according to Ransome form a part of a canoe-shaped syncline with a northwest and southeast axis. On the north the limestones are intersected by a fault, which brings them into contact with the pre-Cambrian schist that constitutes the fundamental formation of the region. The schist is noteworthy from its close resemblance to the basal rock around Globe, Jerome and Prescott, being a fine-grained sericitic or micaceous schist with imperfect cleavage.

On the faulted contact of the limestones and schist an intrusion of granite porphyry forms a conspicuous boss called Sacramento hill. The intrusive mass invades the rocks on both sides and has exerted a pronounced metamorphic action on the limestone, converting it for some distance from the contact into dolomite, and producing the usual series of secondary silicates. It is in this altered limestone zone that the copper ores occur. As a rule the deposits do not seem to favor the immediate vicinity of the porphyry, as in the case with the orebodies of the Clifton district under analogous conditions, but extend a good distance into the limestone. Some of the Copper Queen workings are 2,000 ft. or more from the nearest porphyry exposure, while ore has been found recently in mines of the bonanza group fully a mile from the igneous contact. It is evident that although a close relation exists between the intrusive rock and orebodies, the formation of the latter has involved processes of unusual magnitude in their effects.

IRISH MAG SHAFT, CALUMET & ARIZONA MINE.

The deposits exhibit little regularity as to

distribution within the limestone. They usually occur as lenticular or tabular masses, and lie nearly parallel to the bedding of the country, which is approximately horizontal. The lenses succeed each other vertically and horizontally without definite arrangement. The depth at which they are found increases progressively towards the south. Most of the ore taken from the northern workings of the Copper Queen has been from above the 500-ft. level, but further south the shafts have been carried down from 800 to 1,000 ft. before coming into ore.

In size the orebodies not infrequently attain notable proportions. Stopes measuring 100 ft. in horizontal section, and nearly that in height, are to be seen in the Copper Queen, and some are made much larger. One of the bodies of ore encountered in the Atlanta claim extended from above the 100-ft. to below the 300-ft. level, and on the floor of the latter its section was 200 by 150 ft. More recently an even larger mass has been found in ground near the Holbrook shaft.

The ore as mined varies considerably in character and metallic content. The oxidized material consists usually of carbonates and cuprite, intermixed with ferruginous clay carrying manganese. Quite generally it is associated with chalcocite, which occurs irregularly in the upper levels and is uniformly present near the lower limits of the oxidized zone. Very little pyritic ore has been found in the Copper Queen, but it is encountered in the Lowell and Calumet & Arizona mines.

Aside from the rough sorting done in the mine no concentration is attempted, the ore going direct to the smelter. As a rule no material which carries less than 3 per cent copper is taken from the stopes, and the general average probably ranges from 7 to 8 per cent. The report of the Calumet & Arizona Company for 1903 shows that the average return for the whole year was 178 lb. copper per ton of ore, or 8.88 per cent. The gold and silver values are low, the latter being present in the bessemerized metal to the extent of a few ounces per ton. As the ore is practically self-fluxing and a balance can be obtained between the oxides and sulphides, the operation of smelting is performed at a low cost and without technical difficulty.

So far the actual mining that has been done has not seriously taxed the resources of the district. The Copper Queen workings are naturally extensive, but they are confined to the northern part of the ore-belt and represent only a fair proportion of the development that may be expected in the future. The discoveries made in the "bonanza circle" show that there is a wide area in which the conditions are favorable to ore occurrence. The Copper Queen still has reserves sufficient to maintain steady operations for years to come, to say nothing of the recently opened deposits in its Lowell mine, which are of unknown extent. There is assurance of a rapid expansion of output from the Calumet & Arizona and associated properties, although none of them have as yet fully measured their resources.

The Copper Queen Consolidated Mining Company's holdings include more than a mile of the mineralized belt. On the northernmost of its claims is the smelter site, with the discovery location near by. From this point the company has gradually extended exploration southward, opening new territory as required, until now there are five shafts which give access to many miles of underground workings. The Czar shaft, the first put down, is still one of the main arteries of the system. It is 440 ft. deep and has four levels. To the southeast, 1,100 ft. away, is the 540-ft. Holbrook shaft, giving access to five levels. This is perhaps the most active producer of all. The Spray shaft, 1,400 ft. from the Holbrook, is bottomed at 1,000 ft., but has not been fully opened, little exploratory work having been done below the fifth level. It has three compartments, steel head-gear, and is equipped with a modern hoist. Next in order is the Gardner, 1,450 ft. from the Spray, originally intended as a prospecting shaft, but now being installed with a steel frame and new hoist preparatory to becoming a producer.

In the Lowell mine the Copper Queen Company has undoubtedly a splendid property. The claims on which it is located were purchased three years ago for $500,000, after an unsuccessful attempt had been made by the previous owners to find ore. By extending the shaft a short distance large bodies of high-grade sulphides were encountered, and it is now a large producer. It is the deepest of the company's workings, having bottomed at 1,200 ft. The first ore was found on the 1,000-ft. level, and stopes have been opened on this and the 1,100-ft. level. A drift is now being run to the Gardner, which, when completed, will give underground connection to all the shafts on the north, making a continuous line of development over a mile long. The Lowell is equipped with a 3-compartment shaft, steel head-frame and powerful hoist.

The property of the Calumet & Arizona Mining Company, which has been producing some of the richest ore in the district, comprises a small group of claims between the Spray and Lowell shafts of the Copper Queen. The company has been in operation less than four years, having begun the development of the Irish Mag claim in November, 1900. Within this short period it has sunk a shaft to a depth of 1,250 ft., opened large ore reserves, erected a smelter, and is now turning out copper at the rate of 3,000,000 lb. per month. Moreover, it has already returned to its shareholders in dividends a total of $1,000,000 on the capitalization of $2,000,000. The company has certainly established a record that is unparalleled in the history of copper mining.

It is needless to say that these results have been due in large part to the ability with which the affairs of the company have been directed. In selecting the ground for development, the management made good use of the experience gained by others and showed a practical appreciation of the principles underlying the geological structure and mineralization of the district. No surface indications were at hand that could be used as guidance, the orebodies lying beneath 700 ft. of barren limestone.

Up to the present, exploitation has been conducted through a single shaft, the Irish Mag, but a second, known as the Oliver, is rapidly approaching completion. The mine is opened on six levels, beginning at 750 ft. New hoisting equipment has been installed during the current year which will enable the workings of the mine to be continued below the present depth.

Among the exploration enterprises, of which there are 20 or more in the district, a few only have thus far attained an assured position as mines. The most successful in this respect are those associated with the Calumet & Arizona management, and, like the latter, lying within, or contiguous to, the probable bounds of the main ore-zone.

The Calumet & Pittsburg adjoins the Copper Queen on the southeast; the shaft is some 2,000 ft. from the Lowell and in line with the general strike of the mineralized belt, as shown by existing developments. The company has not been disappointed in its expectations of striking the continuation of the ore-bearing ground from the Copper Queen, and has already enlarged the shaft to five compartments and will instal it for active work. The Lake Superior & Pittsburg comprises a large group of claims, joining the Calumet & Arizona and the Copper Queen on the south. It has been explored by two shafts, of which the more northerly has encountered what is reported to be a very large body of ore. This is the extreme point where anything of importance has been found up to the present.

Through the initiative of the Junction Development Company an interesting and what may prove a valuable piece of exploratory work is being carried on near Bisbee. As already explained, the ore-zone on which the mines are situated form a crescent about the porphyry mass of Sacramento hill. On the south side of the hill, however, the surface rock is Cretaceous conglomerate, capping the limestones, which here have an easterly dip. While on general conditions it is only reasonable to assume that the same metamorphosed belt would be found beneath the conglomerate as adjoins the porphyry on the west, the uncertainties regarding the thickness of the conglomerate cap, and as to whether the dip might not carry the limestones below the zone of mineralization, did not encourage exploration in this direction. The Junction company, after establishing the presence of the limestone at a depth of a few hundred feet by the diamond drill, has sunk a prospecting shaft. Should the search for ore prove successful it will mean an important enlargement of the mining field.

It is probable that the growth of Bisbee during the next two or three years will be more rapid than of any other important copper district in the country. The elements necessary for such an expansion are to be found in the existence of unusually rich orebodies, progressive management of the mining companies, and the admirable facilities of transport and smelting.

COAL PRODUCTION OF BELGIUM.—The British consul at Antwerp, in a recent report, gives the production of coal in 1903 as 23,871,000 long tons, which is the largest output ever recorded. The increase over previous years was due to unusual activity in the districts of Mons, Charleroi, Liège and Seraing. Of the output in 1903, 4,923,000 tons were exported, the greater part (3,656,000 tons) going to France, and the remainder to Germany, Holland and other countries. Competition between the German coal syndicates and Belgium producers has become very sharp, as shown by the imports from Germany, which in 1903 amounted to 2,331,000 tons. The report states that there are many openings for machinery of modern design in the coal mines, as the equipment is generally antiquated. The great Limbourg field also is to be opened shortly, and will create a large demand for machinery for shaft-sinking, hoisting, pumping, ventilating and other purposes.

GOLD MINES OF MINAS, BRAZIL.

By Martin Schwerin.

The evidence of considerable activity in the ancient gold mines of the State of Minas Geraes, Brazil, presents some interesting features for modern engineers, but since the greater part of the general subject already has been presented by others, these remarks will be particularly directed to such points of interest as seem not to have been especially emphasized by them.

Rio de Janeiro, the point of debarkation, is reached by monthly passenger steamers of the Lamport & Holt line from New York, bi-monthly steamers of the Royal Mail line from England and bi-monthly steamers from France. The ports of call of the New York steamers are Pernambuco and Bahia, Brazil, on the voyage south, and the same ports, together with the island of Barbados, on the way north. Both Pernambuco and Bahia are cities of upward of 150,000 inhabitants and possess considerable interest for the visitor. There is an Oriental color and beauty about them that contrasts strongly with the somberness of our own cities. But in Rio and its suburbs the highest development of Portuguese architecture in America is seen. Its streets, marvelous in their variety of color and ornamentation, present scenes that are never to be forgotten. Avenues of royal palms, tropical flowers and shrubbery, with ornate and beautiful residences, make vistas of regal splendor. Rio has a population estimated at about 700,000.

A FAZENDA NEAR SAO GONCALO, BRAZIL.

From there, in Pullman sleeping cars, by the Central Railroad of Brazil, the Ouro Preto gold-fields are reached; they lie in the State of Minas Geraes, which adjoins the western border of the State of Rio de Janeiro. Ouro Preto, founded in 1699, lies at an altitude of 3,500 ft. It was the former capital of Minas, but is now in a most dilapidated condition. The streets are all but deserted and former mansions, now in ruins, are tenanted by the idle and ragged. Squalor reigns in halls where once the fashion of the capital held forth. From a population of 80,000 in the prosperous times there now remain a scant 8,000, whose only occupation seems to be eternal lounging out of balcony windows, with which every house is amply furnished.

Around the town are the mines, which are credited with an enormous production in the second half of the eighteenth century. The veins are massive quartz, both highly inclined fissures and flatly bedded, in a country of schists, quartzites, itabirite (hematite schist), and itacolumite (flexible sandstone). The veins are narrow, never persistent, and run only a dollar or two to the ton or are quite barren. Occasionally there is sufficient auriferous arsenopyrite to make fair values, but such occurrences are so rare as to affect the deposits but slightly; or a streak of high-grade, soft rusty quartz may accompany the vein, but such are quite as infrequent as the bunches of arsenopyrite.

Systematic mining or stoping in any form was not practiced, nor could it be from the structural character of the veins. They are so irregular, split, squeezed, intersected at all angles and with all dips, and so scattered and withal so diminutive that no system could be made to fit the case now, even though the values were several times as great. The method followed was this: A rich streak was found and followed up hill and down vale as long as any profit could be made. If the roof or floor showed values these were gouged with narrow tools as far as the miner could reach without enlarging the opening into the hard quartz. Then at the higher part of the drift another burrow would be cut at an angle upward and backward over the existing drift. From this more ore could be gouged out of the stringer both below and above. And if sufficient ore showed above this new drift a third one would be started so as to continue the zigzag. These irregular drifts lying one above the other were the only approach to stoping that the old miners did, excepting where the whole vein was locally rich enough to take out, and there they excavated a chamber of irregular shape until all the pay ore was removed. Had they found any considerable vertical extensions of rich veins their manner of dealing with such problems would have furnished us a better estimate of their skill as miners.

No mechanical means whatever, not even a wheelbarrow nor a windlass, was used in taking the ore out to daylight. Wooden *bateas* holding from 25 to 40 lb. of rock were carried out on the heads of the workmen. Outside it was ground on a flat rock by a smaller rock, used as a muller, held in the hand. The pulp was washed in the *batea* and a separation of the concentrates effected into gold and arsenical pyrites. And if a close similarity between the present practice of the natives and that of the *antiguos* may be assumed, the pyrite was roasted in open pans, re-ground and panned again.

The question arises as to how it could have been possible to carry on operations in the manner outlined above, the values being so low that under conditions obtaining in the locality to-day, even with the aid of modern machinery and the most skillful management, it would be impossible to meet expenses. The explanation must be sought in circumstances that were very different from those obtaining now. Such was the case. The mines were operated by slaves, and both slaves and mines were owned by powerful families, in great estates that comprehended plantations also. The plantations were tilled for the simple food products required by those laboring in the mines. And since no workmen received wages and but little money was expended for such foodstuffs as were not raised at home, the whole expense of operation was almost a negligible quantity. Almost all the gold produced was profit. There were no dividends to meet, no expensive machinery to be paid for, nor any amortization fund to be accumulated. The manifold burdens imposed by modern financial methods on the management of large enterprises must have lain lightly indeed on the shoulders of managers there. The principal investment was in slaves, and even these were largely recruited in the earlier days of mining from the Indian tribes, against whom there was frequent warfare for this purpose. The natural increase in their numbers probably gave a profit in addition to that resulting from their production of gold.

Under such conditions any pursuit that would give employment to several hundred slaves and enable each to produce but a few grains of gold daily (or its equivalent) would result in a handsome total to the owners. But it does not appear that large fortunes were accumulated. Such a result would have been almost unavoidable had the ores been of only ordinary grade.

Moreover, gold mining in the Ouro Preto fields declined long before the abolition of slavery. Slavery existed in the closing quarter of the last century, but it does not appear that much mining was carried on in this region later than 1820. The causes that operated to this end were the enhancement in the value of slaves about that time and their demand in the agricultural districts of Sao Paulo for the profitable cultivation of the coffee tree; the imposition, some time earlier, of the royal tax of one-fifth of the gross production of gold; the increasing poverty of the veins and the growing scarcity of rich stringers. The royal agent not only collected his master's fifth, but forced the payment in many cases of an additional fifth for his trouble. This combination of circumstances precipitated the rebellion that finally freed Brazil from Portugal. But before the result was reached the gold industry was overwhelmed.

It will be noticed how greatly inferior in metallurgical skill were the Brazilians to even the rude Mexicans. The *arrastre* was unknown. The entire lack of organization and system in all their processes bespeaks a low order of skill. At about the period of the decline Baron Von Eschwege, a German metallurgist and geologist, was brought to the coun-

try to re-habilitate the waning industry. He erected the first gravity stamp, and on the site of old workings at Passagem, about six miles from Ouro Preto, he made an attempt to mine systematically in 1817.

At the present time a few properties are in operation on low-grade ores in other fields, notably the St. John del Rey at Morro Velho, and the Ouro Preto Gold Mining Company at Passagem. In the river beds of the district a few natives, known as *faiscedores,* eke out a scanty existence by washing in *bateas* the river sands. The Ouro Preto Gold Mining Company is working a flat vein having a dip of 20°. Its width varies from 5 ft. to over 30 ft. in some places. The ore is quartz with arsenopyrite and some iron pyrite. The hanging wall is itabirite, the footwall a schistose quartzite. It is worked to a depth of 1,500 ft. on the incline through slopes sunk on the vein. Timber is entirely dispensed with in the stopes because of the adaptability of the slab-shaped quartzite blocks for use in building of dry arched galleries and drifts. Where the vein is of such a width that no quartzite is broken down it is brought from other parts of the mine. This economical and creditable use of the waste is due to the manager, Mr. H. J. Gifford.

The 80-stamp mill at this mine also presents some peculiarities. The ore is first hand-sorted by native women and boys, who reject about 10 per cent of it. It then goes through Blake crushers and is stamped in mortars of English make but of American pattern, through 30-mesh screens. The pulp flows over short blanket strakes, not over 5 ft. long, which are washed frequently in vats of water. The overflowing pulp from the blankets is concentrated on 32 Frue vanners, the concentrates going to the cyanide plant, while the tailings go to long canvas strakes, on which a small additional amount of concentrate is made. The blanket washings are still further concentrated on canvas strakes. The enriched concentrate resulting is washed in *bateas* by native women and the gold separated almost perfectly clean when taken out.

The remarkable feature of the foregoing process is that over 80 per cent of the total mill-saving is made in these *bateas.* No mercury at all is used anywhere in the process. The total extraction is about 83 per cent. The grade of the ore is about $7 per ton. The concentrates from vanners and canvas strakes which are cyanided, together with that part of the blanket washings rejected in their subsequent concentration on canvas strakes, are fed into small iron vats in charges of 5 or 6 tons and agitated with cyanide solution for from 24 to 40 hours. The solution is drawn off by vacuum filtering and the solids run to waste. After the extraction of the gold from the solution, by precipitation on zinc shavings, the solution is run to waste. This is necessitated by its foul condition.

Throughout the plant water-power only is used for mill and shop purposes, compressing air for mine drills, hoisting ore, and even for vacuum for filtering. Mining is done under the contract system, the contractors employing their own men. Wages average from 3 to 3.5 *milreis* per day, which at the present exchange in gold is equivalent to from 72c. to 84c. Boys, of whom quite a number are employed about the mills, especially in connection with the canvas strakes and in sorting, get about half of men's wages. Skilled white labor is paid about $80 per month.

PRECIOUS METAL PRODUCTION.

The following table shows the production of gold and silver in the United States in 1903, as compiled by the Director of the Mint, to whom we are indebted for an advance copy of the statement:

APPROXIMATE DISTRIBUTION BY PRODUCING STATES AND TERRITORIES OF THE PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1903.

(As estimated by the Director of the Mint.)

State or Territory.	Gold.		Silver		
	Fine Ounces.	Value.	Fine Ounces.	Commercial Value.	Total Value.
Alabama	213	$4,400	.....	.....	$4,400
Alaska	416,738	8,614,700	143,600	$77,544	8,692,244
Arizona	210,799	4,357,600	3,387,100	1,829,034	6,186,634
California	779,057	16,104,500	931,500	503,010	16,607,510
Colorado	1,090,376	22,540,100	12,990,200	7,014,708	29,554,808
Georgia	3,000	62,000	400	216	62,216
Idaho	75,969	1,570,400	6,507,400	3,513,996	5,084,396
Kansas	468	9,700	97,400	52,596	62,296
Maryland	24	500	.....	.....	500
Michigan	.....	.....	50,000	27,000	27,000
Montana	213,425	4,411,900	12,642,300	6,826,842	11,238,742
Nevada	163,892	3,388,000	5,050,500	2,727,270	6,115,270
New Mexico	11,833	244,600	180,700	97,578	342,178
North Carolina	3,411	70,500	11,000	5,940	76,440
Oregon	62,411	1,290,200	118,000	63,720	1,353,920
South Carolina	4,872	100,700	300	162	100,862
South Dakota	330,243	6,826,700	221,200	119,448	6,946,148
Tennessee	38	800	13,000	7,020	7,820
Texas	.....	.....	454,400	245,376	245,376
Utah	178,863	3,697,400	11,196,800	6,046,272	9,743,672
Virginia	654	13,500	9,500	5,130	18,630
Washington	13,539	279,900	294,500	159,030	438,930
Wyoming	175	3,600	200	108	3,708
Total	3,560,000	$73,591,700	54,300,000	$29,322,000	$102,913,700

The corrected total for the gold output is slightly less than the preliminary estimate given in our issue for January 7 last. The difference is $833,640, the changes being chiefly in Idaho and Montana.

In silver the corrected value is $1,198,688 less than the earlier estimate. The reductions are in Colorado, Idaho and Utah; on the other hand, the actual output of Montana was larger than the early estimate.

The decrease in gold output, as compared with 1902, was $6,408,300, or 8 per cent. Silver shows an increase of $93,000 in commercial value, which was entirely due to the higher average price of the metal.

SMELTING WORKS LABORATORIES.—The design and construction of an analytical and assaying laboratory for smelting works was described by Herbert Haas in a paper read at the Lake Superior meeting of the American Institute of Engineers, for the details of which reference should be made to the original paper. The cost of the laboratory building, 18 by 48 ft., was as follows: 6,000 ft. lumber, $96; 2,427 ft. flooring and ceiling, $84.94; 4,500 shakes (shingles), $49.50; 4 doors, $12.50; locks and hinges, $8.50; transom plates and sash-bolts, $4; windows, $69; nails, $15; labor, $185; total, $524.44. The cost of a chemist's hearth, which is described and illustrated, was $141.87 in all.

CONDITION OF IRON IN MATTE.—Edward Keller states, in a recent communication to the American Institute of Mining Engineers, that while the presence of metallic iron in iron matte may be satisfactorily established, it is certain that the condition of that element in iron matte may be satisfactorily established, termined. In a paper in 'The Mineral Industry,' Vol. IX, 240, he showed that sulphur, copper and iron contents of a certain matte might be rationally written in either of the following two ways: A. 54.01 per cent Cu_2S, 19.17 FeS, 17.59 Fe_2S. B. 54.01 per cent Cu_2S, 29.92 FeS, 6.84 Fe. This matte was practically non-magnetic. A matte with a tenor of magnetic oxide equivalent to this free iron possesses very marked magnetic properties. Unless the non-magnetic property of the matte in question, or rather of the metallic iron contained therein, be satisfactorily explained, it is, in the absence of chemical proof, certainly rational to assume the presence of an iron sub-sulphide, Fe_2S, or an intermediary one between the latter and the common ferrous sulphide.

CONSTITUTION OF PORTLAND CEMENT.—An important paper by Clifford Richardson, read before the Atlantic City meeting of the Association of Portland Cement Manufacturers, indicates in what direction the knowledge of the composition of portland may be extended. Le Chatelier and also Törnebohm found, by microscopic study, that cement clinker consists of four constituents, alit, belit, celit and felit, having distinct optical properties, and of a fifth amorphous mass without action on polarized light. Richardson concludes that it is a solid solution of silicates and aluminates; alit being a solution of tricalcic aluminate in tricalcic silicate, and celit a solution of dicalcic aluminate in dicalcic silicate. Iron and magnesium, while probably complicating the solid solutions, exert no essential influence. Following analogies of other solid substances, the formation of clinker from pure chemicals, at temperatures below fusion, is probably due to interactions after diffusion. Hence Richardson says that finer grinding of raw materials makes possible lower temperatures in burning, and the relative costs of fine grinding and fuel will determine the fineness of grinding at any given locality. The value of Richardson's paper lies in its showing that by the application of methods used in the study of iron and other alloys the composition of clinker may be determined and its manufacture put on an exact basis. Simple chemical analysis of the constituents of a cement gives little or no evidence of its fitness for any particular purpose.

DEEP ALLUVIAL MINING IN VICTORIA.

By F. DANVERS POWER.

(*Continued from Page* 511.)

The old method of extracting wash from these mines was wasteful. Levels penetrated the deposit at irregular distances and at various angles. At those places where payable gold was found by panning, the wash was extracted; when gold did not happen to show, the ground was abandoned. As the gravel was not being worked out in regular blocks, triangular areas and odd patches of good ground were left, as being too dangerous to attack. In mines where some semblance of system is employed, and all the gravel extracted, the extraction of the supposedly unprofitable areas has yielded excellent returns. So long as the men are working in the wash to the raise, all goes well with the drainage; but when a level dips in the direction of the work, the water makes it uncomfortable for the miners; therefore, when it is seen that a level dips for a considerable distance, either on account of some local irregularity, or because of the natural fall of the ancient river, a raise is made to meet it from the intermediate level and tap the water, as in Fig. 8. The raise subsequently serves for dumping gravel. These raises are 3 ft. by 6 ft. and are divided into two compartments, one for a chute, the other for a ladder-way.

The No. 1, or New Havillah shaft, is sunk 350 ft. on the eastern side of the lead. The Silurian rocks on this side rise abruptly and do not carry much water, but on the western side the bed-rock rises gradually and the water is spread over a large area. From the plat, a

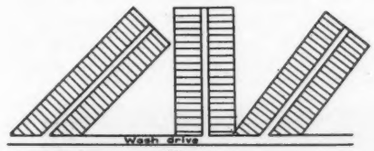


Fig. 5.

main level is extended westward for 1,234 ft., so as to come under the lead. At this point the level branches off northeast and southwest. The timber used consists of posts 8 ft. 6 in., caps 4 ft. 6 in., with a spread of 8 ft. 6 in. at the bottom; laths are driven behind the timbers on top and at the sides. At 238 ft. from the shaft a water-lock designed by Mr. George Richards, of Ballarat, prevents the flooding of the shafts and drowning of the pumps should the latter be stopped for repairs or through accident. (See Fig. 9.) This door, which is elliptical in shape, is 6 ft. high and 3 ft. 10 in. wide, constructed of ⅝-in. steel plates strengthened by H girders rivetted across the face, while the edge is supported by a hoop of H steel. Heavy wrought-iron hinges are bolted to the ring and girders; there are also ten 1¼-in. eye-bolts for securing the door to the frame. A wrought-iron joint ring 2½ in. by ¾ in. lathe-faced, is rivetted to the door, and a 5-in. relief valve is fitted near the bottom of the door. The door frame is of cast iron made in halves, the face of the frame being recessed ⅝ in. deep by 3 in. wide to receive a joint ring of rubber. The frame is secured in strong concrete and brickwork abutments let into the walls, wide inside and narrowing outside, with 1½-in. bolts, a joint being made of cast-iron borings, brick-dust and portland cement. Near the bottom of the frame castings are two 9-in. diam. outlet pipes, which are built in and provided with 9-in. wedge valves. An air pipe is also built through the abutment at the top and is provided with a valve on the outside. The weight of the door, frame, pipes and valves is about 7½ tons. In the northeast branch level eleven bores have been put up, partly across and partly with the lead; the wash, which averages 4 ft. thick, is 49 ft. 6 in. to 39 ft. 6 in. overhead. Good prospects were obtained from all the bores that struck wash. The average flow from each bore is about 12,260 gal. per hour, the pumps

Fig. 6.

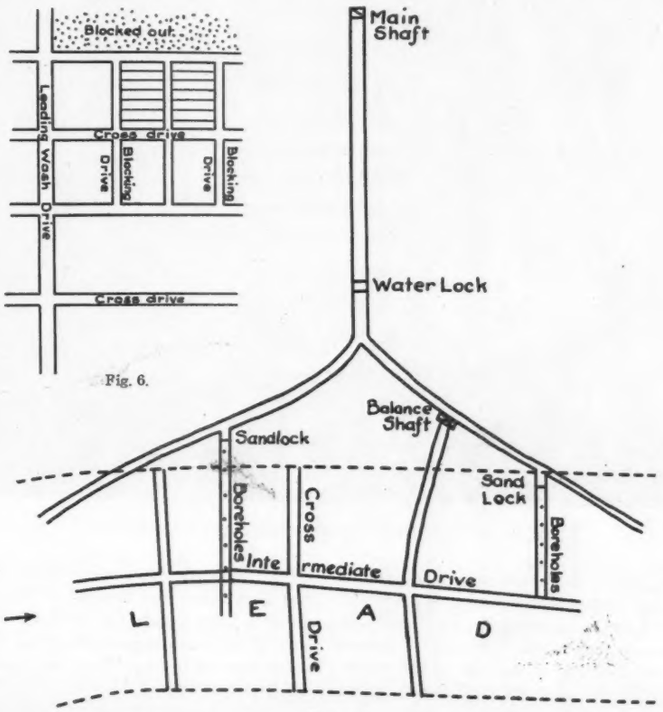


Fig. 7.

discharging at the rate of 128,745 gal. per hour. Each bore is provided with a quick-closing slide-valve by which the flow can be cut off instantaneously. The bore-holes are three inches in diameter, and are lined with tubing driven up by means of hydraulic pressure and wedged with wood. If the rush of water and sand is so great as to scour the tubes, small tubes are driven inside the larger.

steel angle-irons rivetted across the face with ⅞-in. stud rivets. The opposite side of the door is fitted with a face-plate around the edge, 6 by ⅞-in., which fits into a recess 6 by ½ in. deep in the door-frame, and into which is fitted a rubber joint. The door-frame is constructed of 18 by 10-in. blue gum,* secured to the massive brick and cement abutments with eight 1½-in. bolts extending through the abutment to a second frame built of 18 by 10-in. blue gum. The door is hung with two hinges made of 6 by ¾-in. steel, the holes in which are sufficiently large to allow the door when closed to be drawn up close against the rubber joint. The door when closed is fastened tightly by connecting with rods and ring-bolts to strong pieces of timber kept in readiness and placed across the outside frame when required for use. Below the bottom of the door, on both sides, two 14-in.

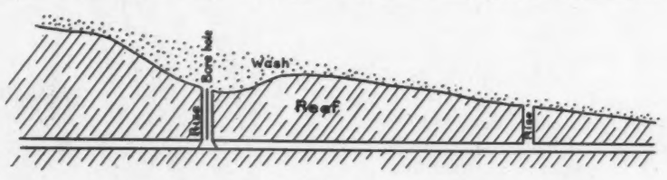


Fig. 8.

A sand-lock is constructed between the bore-holes and the main level.

The No. 2, or Charlotte Plains, shaft is sunk 344 ft. on the eastern side of the lead. A water-lock door of rectangular shape (Fig. 10 and 11), designed by Mr. William Capron, the manager, is built at 500 ft. from the shaft, this being the nearest point where the rock would allow a good joint to be made. The weight of the door, valves, pipes, etc., is 4½ tons, besides which 21,000 good sound bricks, 26 loads of sand and 75 casks of best portland cement were used in the construction of the abutment. The door is constructed of ⅞-in. steel plates strengthened by 6 by 6 by ⅞-in. cast-iron pipes have been built into the abutment and fitted with 14-in. wedge-valves (Fig. 11), tested to a pressure of 200 lb. per sq. in.; these serve as a drain under normal conditions. A 14-in. cast-iron pipe, also fitted with a wedge-valve, has been built in the abutment near the top of the level; through this air is allowed to escape when the water-lock door is closed. The main level branches are at 1,021 ft. from the shaft. A sand-lock was constructed in the cross-cuts both up and down stream, and inside these bores were put up to the wash, which in the northwest cross-cut is from 55 to 61 ft. overhead, the wash from each bore

*The common tree of Australia, *eucalyptus globulus*.

showing gold. The southwest branch of the bottom level will eventually connect with the workings of the New Havillah mine. Each sand-lock, as shown in Fig. 12, consists of two frames made of 12 by 8-in. blue gum, placed three feet apart, and attached to brick abutments with six 1⅛-in. bolts which extend through both frames. The door is constructed

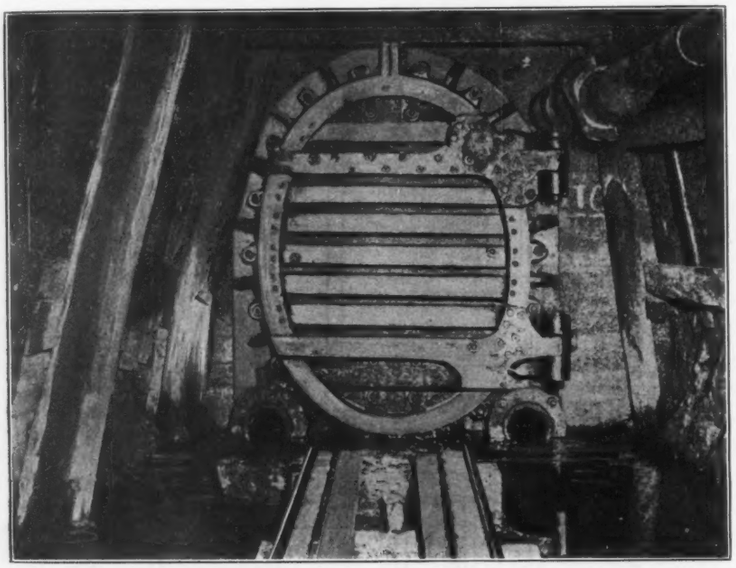


Fig. 9. WATER-TIGHT DOOR, NEW HAVILLAH MINE.

wholly of wood, 18 by 6-in. blue gum, and is made in two parts, each hung on two vertical hinges of 3 by ⅞-in. iron; the two parts are beveled where they meet. There is no fastening to these doors, as in the case of the water-locks, the pressure of the slurry being sufficient to keep them closed. A six-inch cast-iron air pipe has been built in the brick abutment near the top; to this an air-valve is attached on the outside. There are flood-gates of 16 by ¾-in. iron plate over the drains of the level, situated inside the door, which are held by wires in such a manner that in case of a rush of sludge the wires will give way and the gates close. Should there be men in the level, the first to escape closes the lower portion of the door so as to dam back the slurry, leaving sufficient space for men to escape over the top; the last man closes the top portion, which then seals that part of the mine. As the bores are generally put up from levels driven for the purpose, the closing of such levels, though a loss, is really no permanent obstruction to work. The cost of mining and treating will probably be from $1.40 to $1.70 per ton.

The channels forming the Chiltern leads are fairly well defined, and the wash is of regular thickness. The deep alluvial ground is about 300 ft. below the surface and is not capped with basalt. The grade of bedrock is regular, averaging from 20 to 25 ft. per mile. Those leads that originate in the granite and schistose ranges contain sufficient tin to make it worth saving. At Chiltern, for a length of about 2,420 yd., gold of the value of $7,250,000 was extracted. The last half year's results of the Great Southern Gold Mining Company show that the area worked was 8,164 sq. fm., yielding 5,153 oz., or an average of 12 dwt. 15 gr. per fm.

The Chiltern method of working is well described by Mr. Stanley B. Hunter,* to whom I am indebted for much information. A shaft is sunk on one side of a lead for 40 ft. or even 80 ft. into solid ground below the wash. It is economical to sink this greater depth in comparison with the 'down country' method, as the cost of intermediate work is saved, and as a further advantage there is seldom any waste of work through loss of level. Two chambers are worked out; one a few feet above the bottom of the shaft, the other a little below the level of the deepest part of the wash opposite to it, as determined beforehand by boring. From the upper chamber a level with a slight upward grade is driven to intersect the lead. Before this level cuts the wash, boreholes through the roof test the pressure of the water in the lead, and if the pressure is too great for safe approach, a 'reef level' is advanced from the lower chamber until under the center of the lead, when drainage bores unwater sufficient of the overlying area to permit the upper level to be continued without danger. The lower level is eventually used as a drainage channel and for conveying wash to the shaft. The bedrock in this district is so even aross the lead that the ground can be safely drained, even if the boreholes do not strike the deepest parts. The upper and lower levels are connected by a chute and 'pass-by' (ladder-way) not far from their respective chambers. Raises are made between the 'reef' or 'bottom-level' and the 'cross-drives' in various parts of the mine, and as the leading 'wash-drive' is always in advance of the 'reef-drive' there is no fear of a burst of water when raising from one to the other, as in the case in the 'down country' system when penetrating undrained country. It is found that the wash gets packed when allowed to fall down vertical chutes, so they are made at an angle of about 60°, in order that the dirt may roll rather than fall down. If the bottom level is not parallel with or at right angles to the 'cross-drives,' the direction of the longer axis of the raise has to be gradually turned round like the winding of a spiral staircase. The leading 'wash-drive,' which is extended straight, keeps some 300 to 400 ft. ahead of the 'reef-drive,' serving as a pilot, and 'cross-drives' are pushed at intervals of 200 to 300 ft. at right angles to it on either side till they meet the 'high reef' or bank of the lead, no matter whether such cross-drives are at right angles or oblique to the course of the wash. These 'cross-drives' not only serve to drain any water that may remain in partly drained ground through which the leading 'wash-drive' is made, but also serve to locate the course of the lead. Should the direction of the leading 'wash-drive' take it out of the deepest ground, a 'cross-drive' is made into the leading 'wash-drive' till the deep ground is reached, when the leading 'wash-drive' again starts off at right angles. At the same time that the levels in the wash are proceeding, a small level known as a 'timber and return' or 'upcast air-course' is driven on one side, in the solid reef, on the same level as the leading 'wash-drive,' and generally parallel with the lead. This is connected with a timber shaft or with an upcast compartment in the main shaft. The 'cross-

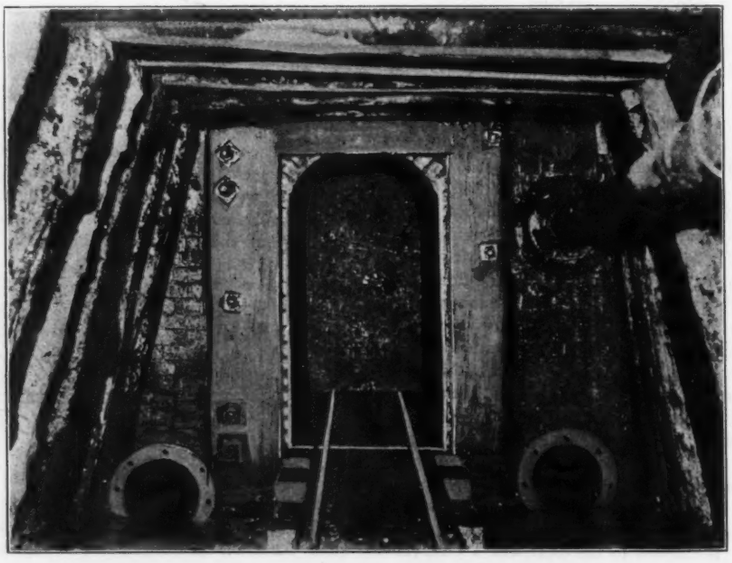


Fig. 10. WATER-TIGHT DOOR, CHARLOTTE PLAINS MINE.

*S. B. Hunter, Report on 'The Chiltern Gold Field, *Memoir* No. 1, Geological Survey of Victoria, 1903.

drives' are holed to this timber level, where necessary for air or timber. Such a level well repays the cost of making, as it provides good ventilation; there is no hauling up of timbers through passes, as in the ordinary 'down country' method, and the bottom level is kept entirely free from timber trucks. The 'cross-drives' are connected every 46 ft. by 'blocking drives,' therefore allowing six feet

[Fig. 11. AIR AND WATER VALVES, CHARLOTTE PLAINS MINE.

for the width of the level, a block or pillar 40 ft. wide is left. In the Chiltern and Rutherglen system of opening up a mine, from 20 to 30 per cent of the ground is taken out by 'driving.' As there are ample means for escape by this system, blocking-out can be commenced from near the main shaft without fear of cutting off retreat in case of accident. While blocking-out is going on in one section, another section is being prepared by making 'block-drives,' while still further ahead the ground is being opened up and drained by 'cross-drives.' This is an advantage, as working in dry ground is cheaper than working in wet ground.

The average value of the ground of the Chiltern Valley Gold Mining Company per square fathom is $18, the average approximate working cost is $13, and the average width of the lead is 350 ft. In all calculations of values in Victorian deep leads, a square fathom of wash dirt in the ground is taken as the unit. When working in wash, one speaks of 'a set,' each set of timber being about 4 ft. 6 in. apart; taking the width of the level into consideration, the area taken out for a set is about three-quarters of a fathom.

Practically all the wash opened up on the 'down country' system is extracted by 'panelling.' This consists of simply taking the ground out in strips at right angles to a level for the width of a set, the extraction commencing away from the shaft and working toward it. The levels from which the panels are worked are generally driven in such an erratic manner that much ground is lost for want of system, and as blocks of supposed poor ground are left standing, and also blocks that cannot be safely attacked on account of the bad method of laying out, the roof does not cave in uniformly. (See Fig. 5.) When panelling, the men work on their sides or squatting down, and they scrape up about six inches of the floor, the amount varying with the district. The roadway is a little below the panels, partly with the object of giving more head-room, and partly to assist the men when loading the wash-dirt into trucks, it being shoveled from the face or brought in wheel-barrows. The roof of the panels is held up by two posts which support a light lath, those furthest in being slighter than those near the exit, as they do not have to remain in use so long.

The extraction of wash by blocking is generally employed in the Chiltern and Rutherglen districts. Blocking costs 25 cents per fathom more than panelling, as more ground is taken out, but as an offset the men have more room to work in. The pillar left after the ground has been opened up is divided longitudinally by an imaginary line; the mates of each blocking party of two pairs work up to this line from the blocking drives on either side of it, commencing at the end nearest the worked out ground. (See Fig. 6.) All the blocks in a section are worked simultaneously, and the working face is kept even right across the lead. No dirt is stowed in the old workings, the ground overhead being allowed to fall in. At Chiltern the miners extract about two feet of wash and one to one and a half feet of 'reef bottom.' If the distance is not too far to truck, one trucker will do the work for two pairs of men. Miners support the roof with light timber as they proceed, and a temporary rail-track is laid, which is always kept at a convenient distance from the face.

At the Chiltern Valley mine, electric locomotives are used underground for drawing the trains of trucks to and from the bottom of the shaft along the main levels; electric lights are also employed. The steam puddling machines are 18 ft. diameter. After being puddled, the wash-dirt is run into a revolving cylinder made of steel bars 2 in. by ½ in., not more than one inch apart; it is 12 ft. long, 5 ft. in diameter, and is given an inclination of one in eight. This revolves six times per minute, and by separating out the larger stones saves much labor that is generally expended in forking. The finer material that passes through the bars of the trommel flows over sluice boxes 54 ft. long, the gold being saved in cast-iron ripples which cover the bottom.

Baumhauerite is a new mineral found in the Binnenthal, Switzerland. It has the chemical formula $4PbS, As_2S_3$, and crystallizes in the monoclinic system.

Diamonds lost while drilling may be recovered by fitting a ring of beeswax or clay on to the end of the drill-rods and lowering them to the bottom of the hole. The diamond is pressed into the soft medium employed. When a diamond is imbedded in the rock it is advisable to use a shell pump made of iron or tin-plate, with a valve opening upwards in the extreme lower end. The shell is lowered to the bottom of the hole and rapidly worked up and down for some minutes. Loose pieces and débris are carried into it by the rush of water and are deposited above the valve, and carbons, if loose, may thus be picked up.

Fig. 12. SAND LOCK AND FLOOD GATE, CHARLOTTE PLAINS MINE.

BLAST FURNACE CHARGING APPARATUS.*

By T. F. Witherbee.

That the single charging-bell properly proportioned, is a good all-around device for distributing the material in a blast-furnace can scarcely be questioned; yet it is equally true that, in some cases, it has not given perfect satisfaction. This has been demonstrated by the use of double bells, at furnaces under the best management—generally in cases where anthracite, either alone or with a portion of coke, was used as fuel. The defect of the single bell seems to be that it does not permit, beyond very narrow limits, such changes in charging as may be required by the temporary condition of the furnace.

Modern furnaces using Connellsville or other good coke and Lake Superior ores seem to be well served with a single bell. At least, up to a certain size, somewhere about 18 by 85 ft. to 19 by 90 ft., they make low-silicon pig-iron with about 1,800 lb. of fuel, or in some cases very much less.

The author cites six instances in which other forms of charging apparatus have been employed with advantage, which are described and illustrated.

It is currently reported that the modern large furnaces—from 90 ft. up—have not proved very satisfactory, so far as regularity of working and fuel economy are concerned. In the West several have been blown out after a few weeks' run, for decapitation and other changes. The manager of one of the largest groups of furnaces in the United States predicted that the two which his company had under construction would not surpass the 85 by 18-ft. stacks except in quantity of product. The performance of these furnaces has more than confirmed his judgment, since they have never consumed less than 2,000 lb. of fuel per ton of iron. It seems incredible that an addition of a foot or two to bosh-diameter, and 15 or 20 ft. to height, should be attended with such unsatisfactory results as are reported. One of my correspondents attributes this experience to a 'wandering' of the blast—which is very possible, since the conditions for such a wandering are provided by the (from one point of view) excessive tuyere-area.

At an anthracite-furnace, with blast heated to about 1,400° F., the tuyere-pipes were, of course, generally bright red; but it was noted occasionally that only two or three of the six tuyeres were so, the others being black, showing that nearly all the blast was passing through the red-hot ones. By partially closing the valves in the tuyere-stocks of the hotter ones, the others could be reddened, and the blast, thereby, more evenly distributed.

Subsequently, a direct experiment showed that the volume of blast which was entering the furnace through 75 sq. in. of total tuyere-area would pass out into the open air through 30 sq. in. at the same pressure. Probably this condition exists approximately at all blast furnaces.

While it is easy to demonstrate blast-wandering, the remedy is not so apparent. Maintaining a considerably higher pressure in the bustle-pipe may tend to remedy the evil; but so long as the method of charging keeps the center relatively more open, it will not be practicable to reduce the tuyere-area; for, in such a case, the open center would be burned out, and the most serious of all blast-furnace derangements, a ring-scaffold, would be set up, with its accompanying dust-throwing, slips and so-called explosions.

Perhaps any defects in working, which may have been shown by the 'Jumbo' furnaces, are due, not to the size of the stacks, but to the way in which the materials, including the blast, have been distributed. If their reported fuel consumption could be brought down to the best records of the smaller furnaces, it would represent a saving of over $100,000 per annum for each furnace—a sum of sufficient importance to justify the slightly increased complication of the charging-apparatus.

It will be a surprise if the monster Buffalo furnaces do not even surpass this fuel economy, not on account of any extra super-heated blast that may be at their command, but by reason of their improved charging-apparatus, which, to my mind, shows a step in the right direction.

*Abstract of a paper read at the Lake Superior Meeting of the American Institute of Mining Engineers, September, 1904, from the preliminary proof, not yet revised by the author and not quoted as authoritative.

IMPROVEMENTS IN THE MECHANICAL CHARGING OF THE MODERN BLAST-FURNACE.*

By David Baker.

The large modern blast-furnaces, equipped with ore-bins, larries and mechanical means for putting stock into storage, withdrawing it therefrom, and charging it at the tunnel-head, are wonderful in capacity; yet, with some notable exceptions, they have disappointed us in economy—that is, in the items of low fuel-consumption, uniformity of product, freedom from slips, and reduced cost of repairs and re-lining.

The modern stack tends to work irregularly; slips are too frequent and too much 'off' iron is made; the furnace 'swings' too often and too much. It is this irregular working that causes the greater fuel-consumption. When a furnace begins to work irregularly, one of the first things to be examined in searching for the cause is the distribution of the stock on top. One of the great objects of mechanical filling was not only the saving of labor, but also the elimination of irregular charging, which was known to exist where the work was done by hand.

For many years before closed-top furnaces became the rule, the simple bell-and-hopper charger, when honestly handled, accomplished a very even distribution of the charge. Each barrow-load of material was dumped in a certain space on the bell, to be changed at the next charge. It was a common practice to charge the coke, stone and ore in layers. But to do so we depended on the honesty of the top-chargers; and, too frequently, in order to save distance in wheeling, the larger part of the stock was dumped on the side nearest the hoist, or, to avoid a place where hot gas was escaping from a leak in the bell or hopper, preference was given to the cooler side.

In seeking for a mechanical device for furnace-charging, no attempt was made to dispense with the ordinary bell-and-hopper top, but various plans were proposed to utilize the skip-hoist, on account of its simplicity and great capacity, by adding some receiving-hopper, that should discharge its contents evenly on the main bell-and-hopper.

The problem is to dump the skip-bucket, containing material of different sizes, at a given point on top of the furnace, so that the lumps and fines will be equally distributed around the furnace-bell. To accomplish this, sundry contrivances have been constructed, consisting of a receiving-hopper, into which the skip or skips dump, and which discharges into a circular receptacle, a cylinder or frustrum of a cone, closed at the bottom by a small bell, the whole apparatus being placed immediately above the main bell of the furnace. Each different design was supposed to have its special merits, but, in most cases, was simply the result of an effort to avoid somebody's patent.

Another improvement in top-charging is the use of a gas-seal to prevent the escape of gas when the charge is lowered into the furnace. This is, in fact, not only an economy, but also a necessity, in order to protect the superstructure on the furnace.

Experiments were made with different arrangements of skip-hoists, which showed that the double-skip, with proper form of furnace-top, gives a more even distribution of the lumps and fines than the single skip. As a matter of fact, the double form has been most widely adopted.

As a result of these experiments, the distribution with the double bell was considered good enough, counting upon the more rapid dumping of the actual furnace-skip to prevent sorting of the material and to make up for defects of distribution developed in experimenting with the model.

As soon, however, as the furnaces provided with the double bell were started, it became apparent that most of the lumps were being thrown to the side opposite the skip, and, though deflectors were promptly placed in the receiving-hoppers, the results have been unsatisfactory; the life of the linings (which cut out on the side opposite to the skip) has been short, and this is the history of nearly all double-bell chargers. Some of them cause the furnaces to cut out faster than others, by reason of local conditions, such as the physical condition of the coke, limestone and ore; but with practically all of them the lining tends to wear faster on one side—in the majority of instances the side opposite to the skip. That is not true, however, of the furnaces at Duquesne, Pa., at which very creditable work has been done with the double bell. The reason seems to me apparent. The skip at these furnaces does not dump, but discharges from the bottom over a small bell. This is a potent preventive of 'sorting'; the most important fact is that the same skip-bucket is filled in the stock-house from two opposite sides. If it were filled by chutes on one side, the sorted lumps would roll to one side and eventually land in the furnace on that side. If the skip-bucket at Duquesne could be filled from four equi-distant points of a circle, the distribution would be better. A still simpler device might perhaps secure the desired purpose.

*Abstract of a paper read at the Lake Superior Meeting of the American Institute of Mining Engineers, September, 1904, from a preliminary proof, not revised by the author and not quoted authoritatively.

MINERAL PRODUCTION OF SWEDEN.—A report issued by the Stockholm Board of Trade shows the following mineral outputs for the kingdom in 1903 and 1902, the quantities being in metric tons:

Mineral.	1902.	1903.	Changes.
Iron ore	2,896,616	3,677,841 I.	781,225
Silver and lead ore	9,378	9,792 I.	414
Copper ore	30,095	36,687 I.	6,592
Zinc ore	48,783	62,927 I.	14,144
Manganese ore	2,850	2,244 I.	606
Iron pyrites	....	7,793 I.	7,793
Coal	304,7	320,390 I.	15,657

There was a remarkable increase in iron ore production, chiefly owing to the opening of new mines, the ore from which is exported

CONDITION OF THE QUICKSILVER INDUSTRY IN BREWSTER COUNTY, TEXAS.

BY WM. B. PHILLIPS.*

There are now two companies producing quicksilver in the Terlingua district, Brewster county, with a third building a new furnace. The Marfa & Mariposa Mining Company has two 10-ton Scott furnaces in operation at Terlingua P. O. A considerable quantity of the cinnabar is now obtained from workings a good deal deeper than heretofore. Up to the beginning of the present year by far the larger quantity of quicksilver was obtained from comparatively shallow pits and open cuts in the Edwards limestone, but the company, being considerably to the good in its operations, extending now over about four years, thought that something could be risked in deeper work. The results have been satisfactory. The ore continues in depth, the quality being such as to keep the two furnaces steadily at work. The wire-rope tramway connecting the more important shafts with the furnaces has enabled the company to cheapen its transportation costs, and at the same time to widen the workable area. In addition to the cinnabar, which continues to be the chief ore, important finds of terlinguaite (an oxychloride of mercury) are made from time to time. The workings, which are to prove the ground in California hill, near the contact of the limestone with a butte of andesite, are not yet sufficiently far advanced to enable one to speak of this feature. Judging, however, from other localities where workable cinnabar is found in intimate association with igneous rocks, one may, perhaps, also anticipate the discovery of good ore at this place. Reference to this will be made when I speak of the workings of the Big Bend Cinnabar Mining Company and the Dallas Mining Company, at Study Butte, 12 miles to the east.

Mr. H. W. Turner, of San Francisco, an experienced mining engineer, has taken charge of the Mariposa property. He is returning to his first love, as he published several years ago one of the early papers dealing with the Terlingua quicksilver district. He now takes the position of Mr. W. L. Study, who goes as manager for the Big Bend Company. Mr. Turner had his work cut out for him. He succeeds one of the best men in the district, for I do not hesitate to say that in a large measure the success of the Mariposa company has been due to the perseverance, intelligence and faith of Mr Study.

The Marfa & Mariposa Company has been more successful than any other company in the field. It had ample capital, good property, and conservative and skilful management. I do not know that it had or has to-day better property than any other company, but it is beyond question that its success has been the salvation of the district. Other companies arise, acquire good property, build furnaces, operate them for a while, and then withdraw, but the Mariposa people go quietly on and turn out quicksilver month after month and year after year. It provides to-day the only example of a continuously profitable quicksilver mine conducted on a considerable scale in the Texas field. Other companies, as, for instance, the Terlingua Mining Company and the Colquitt-Tigner Mining Company, erected good furnaces, but they are now cold. Why, it is, perhaps, not the province of this article to discuss, but I speak of things as they are now.

Just as good ore came from the property of the Terlingua Mining Company or the Colquitt-Tigner Mining Company as was ever found in the district. The 50-ton furnace of the former company and the 10-ton furnace of the latter were well built, and each one turned out a fair yield of metal during the last run. But something went wrong and operations were suspended.

Six and a half miles east of Terlingua is the property of the Chisos Mining Company, Sec. 295, Block G 4, Henry J. Lewis, manager. Mr. Lewis is operating four 600-lb. iron retorts, and has done very well this year, using selected ore. At this camp the ore is held in Austin Chalk and Eagle Ford shales, the two formations shading into each other with no sharp line of demarkation. A drift is now being run on the contact between the shales and an outcrop of igneous rock. There is found here, in close association with the cinnabar-bearing chalk and shales, a small area of the Cretaceous coal measures, a formation more largely developed as one goes towards the east and reaches Terlingua creek and Rough run. This property adjoins Sec. 70, Block G 12, where the McKinney Bros. built some retorts last year and operated them for a while. Good ore was found here, as also on the Dawson claims, north of McKinney, but nothing is being done now. The ore from Secs. 70 and 295 contains bituminous matter; both oil and ammoniacal compounds distil over with the quicksilver. The Marfa & Mariposa Mining Company, with two 10-ton Scott furnaces, and the Chisos Mining Company, with four 600-lb. iron retorts, are the only producers of quicksilver in the district to-day.

The Big Bend Cinnabar Mining Company, H. M. Nesmith, manager, and the Dallas Mining Company, W. L. Study, manager, are in Sec. 216, Block G 4, at Study Butte, 12.5 miles east of Terlingua and 6 miles east of the property of the Chisos Mining Company. The Big Bend Company has recently let a contract for the erection of a 50-ton Scott furnace, as was mentioned in my former letter (this JOURNAL, Vol. LXXVIII, No. 6). So far as concerns the occurrence of the ore these camps are, perhaps, the most interesting in the entire field. The cinnabar is held not only in the clays and shales, but also and particularly in a purely igneous rock closely resembling rhyolite, but needing further study. This rock outcrops on the top of the butte and dips towards the north and east under the shale. The thickness of the lava sheet (it may originally have been a laccolite) is about 200 ft., and it carries cinnabar in thin stringers, as small and rich veins and as impregnations with flattened pyrite crystals. Much of the rock, while not showing visible cinnabar, 'horns' well, a point that it is provident to remember when prospecting.

Neither of the companies had penetrated the lava sheet by the middle of August, the Dallas company having encountered more water, at a depth of 140 ft., than could be handled without a steam pump. The main shaft of the Big Bend company is down 140 ft. on the hill above the shaft of the Dallas Mining Company, but the difference in elevation being nearly 100 ft. only a trickle of water is coming in. The cinnabar in the igneous rock is not confined to any one horizon, or level, but is found all the way down the shaft, not in large amounts, it is true, but the material is workable and will all be sent to the furnace. Now and then the stringers thicken and high-grade ore is obtained. I have a piece of the rock showing three distinct stringers of cinnabar, about half an inch apart and parallel. Occasionally one may see evidences of decomposition in the gangue, where it is penetrated by the stringers of ore, but this is by no means the rule. For the most part the material is perfectly sound. The cleavage planes of the rock often show a coating of cinnabar and pyrite, the latter in tubular form. At Study Butte the cinnabar occurs in three distinct classes of material: In the unaltered igneous rock, in the decomposed igneous rock, and in the clays and shales of the Upper Cretaceous. It is the purpose of the Big Bend company to sink the main shaft to a depth of 500 ft., through the lava and into the underlying shales. The Dallas Mining Company will also sink to this depth and one may look forward to some important contributions to the geology of the district, as this has affected the deposition of the ore.

These two companies are about to come to an agreement for the installation of a pumping plant on Terlingua creek, 1½ miles distant, to supply the boilers and camps with water. They are more favorably situated with respect to water than any of the other companies, having an abundant supply within 1½ miles, the elevation to be overcome being about 300 ft. to the top of the Butte, or 250 ft. to the boilers at the Big Bend shaft.

The Dallas Mining Company is also opening some promising prospects in Block G 3, southeast of the Chisos mountains, at the Lindsey finds, described by the writer in this JOURNAL, Vol. LXXVII, No. 4.

The Comstock Mining Company is prospecting in Sec. 34, Block G 12, near the Colquitt-Tigner property, and Mr. McFarlane is working at the old Contrabandista, northwest of Sajitas, and about 10 miles west a little south from Terlingua.

Messrs. Dewees & Goade have secured some of the claims formerly held by the Terlingua Mining Company, in Sec. 40, Block G 12, and are taking out some excellent ore.

Active prospecting is in progress on Big Christmas mountain (see this JOURNAL, Vol. LXXVIII, No. 6), but nothing is now being done to develop the discoveries made at the Croton spring, 12 miles southeast of Christmas mountain.

In Block G 2, east of the Chisos mountains and south of the Black Knob, fair washings of cinnabar have been found, and it is also reported from localities east of Tornillo creek and from the vicinity of McKinney Springs, Sec. 54, Block 20.

Taking the district as a whole, the tendency of the new finds is decidedly towards the east, and further discoveries may be expected east and southeast of the Chisos mountains.

The scarcity of fuel is a serious drawback. Up to this time the ordinary timber of the region, such as mesquite, cottonwood, cat-claw, etc., has been used, but such growths are seldom dense, large or abundant, and they have been drawn upon so persistently that the end is plainly in view. There is plenty of good timber on the upper reaches of the Chisos mountains, and on some of the foothills oak, cedar, juniper and piñon, on lands belonging partly to the public school funds and partly to the railroads. To use this, however, requires a long haul, from 20 to 40 miles, and the price has risen to $6 a cord, delivered, some offers even at this price having been refused by the wood-haulers.

*Director University Mineral Survey, Austin, Texas.

It was to study the possibility of using the coal along Rough Run and Terlingua creek that a party was sent out this summer by the University Mineral Survey. The result of the investigation is to confirm previous conclusions that while there does not appear to be any large coal area, and while the seams can not be expected to yield more than 15 to 20 in. of good fuel, still there is enough for all practical purposes.

If there is to be any considerable enlargement of the quicksilver industry in Brewster county, coal must be used as fuel in the furnaces. It is useless to shut the eyes to facts that must be patent to anyone who has studied the question. The supply of wood, never very abundant, is steadily diminishing. It is obtained with greater and greater difficulty, and from longer distances. In order to make the supply in the Chisos mountains available, expensive roads will have to be constructed and maintained, and a much larger number of wood-choppers and haulers employed.

The quicksilver industry in Brewster county is, I think, in a healthy condition in spite of the closing down of two plants, the Terlingua Mining Company and the Colquitt-Tigner Mining Company. The Big Bend company and the Dallas company are pushing their work with intelligence and skill. New finds are being made on the older properties, as well as in other localities, more money is going into the district, and a better class of miners will inevitably be drawn thither. All ordinary and some skilled labor is now performed by Mexicans, the wages ranging from 90c. to $1.25 a day. This may appear cheap enough, but some labor is dear at almost any price. The Mexican laborer, as a rule, seems to lack discretion; he cannot be left to do his work without close supervision, resembling in this respect some other citizens of the United States that could be mentioned. He is willing and faithful, but somewhat averse to burdening his mind with what, to him, are unnecessary details. He prefers a shallow hole filled with powder and a minimum of tamping to a deep hole with just enough powder and strong tamping. But he will work all day under a sun that leaves little to be desired in respect of heat, and will take a prospecting outfit and drift off into the hills where Americans find life somewhat too monotonous and arid. It must be said to his credit that he has found nearly all the cinnabar in the district, but when he is on the trail of a grub-stake he is likely to bring in stuff that has already been found. *"Azogue, Señor, muy rico." Dońde? "Otro lado."* But the *otro lado* may be a dump from some hole already worked. It is well to bear such things in mind, for there be not a few who have gone off on just such a snipe hunt, and who are still holding the bag.

WIRE-WOUND WOODEN PIPE.—United States Consul L. E. Dudley says that in April of this year the Canadian Pipe Company installed a plant at Vancouver, B. C., for the manufacture of wire-wound wooden pipe, since which time between 30 and 40 carloads have been shipped to the Northwest Territories, Manitoba, and Vancouver Island, and other orders are on hand which will be filled within a short time. It is claimed that this pipe is superior, for water-supply purposes, to iron pipe and can be furnished at less than half the price. Besides this, it is much lighter to handle and is not so liable to burst upon freezing as pipe made of iron.

GOLD DEPOSITION BY DRAINAGE.

By William Bradford.

Experience has taught me to believe that had the earth's crust been cracked vertically to the hot regions, there would have been little gold remaining in mineable depths, provided such cracks had no 'walls-together,' or other partial obstruction to circulation in them.

Fig. 1.

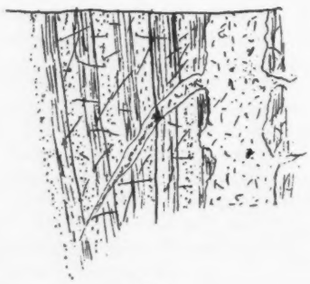


Fig. 2.

Fig. 3.

Fig. 4.

Gravity, in unimpeded vertical conduits, would have taken all the heavier minerals straight away to the hot regions, where they are spread again, to be again raised with their country into cooler temperatures, and again drained into fracture systems, and so on. No, the twist to the rock masses, created many non-continuous receptacles for lode-stuff. These dip at all angles from the horizontal to vertical, and it is found that the nearer the approach to the horizontal of the dip or pitch of the receptacle,

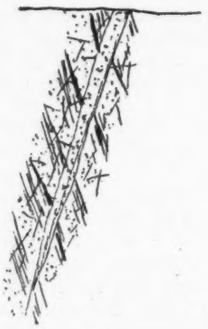


Fig. 5.

Fig. 6.

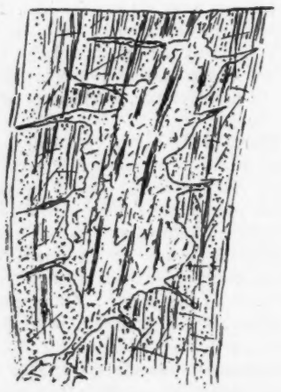


Fig. 7.

the coarser the gold. The rule is that where the receptacle is horizontal, or nearly so, the deposition of the gold has been made at the point of contact of the drain with the receptacle (Fig. 1). The gold in such instances is very nuggetty, because gravity cannot pull it either way. In Fig. 2, the receptacle dips at about 45° from the horizontal and the point of

contact of the drain, with it, is near its terminal. Accordingly the influence of the congestion of fluids caused by the nearness of the terminal of receptacle to the point of contact of the drain with the receptacle, has helped matters in causing gold to be deposited in coarse and nuggetty form at the point of contact, and the gravity pull has scattered some of the gold in finer particles down the floor of the receptacle (never up). Where the receptacle dips at a wider angle from the horizontal than 45°, the gold descends till caught by a recess in the wall of the receptacle (Fig. 3), or by a ledge caused by a bend in the wall (Fig. 4), or by a 'walls-together' tight part of the receptacle (Fig. 5), or by a compound fracture, as shown in Fig. 6 and 7.

Thus it appears that deposition of gold is dependent on much or little obstruction to the movement of liquids by gravity, exactly as snow or dust is deposited on the slightest deviation from the vertical of a wall, or any surface other than vertical. As to the presence of precipitants to throw down the gold (as alum throws down the mud of water), there appears to be precipitating material present in sufficient quantities for action, in all rocks, provided the gravity progress of fluids is obstructed enough to cause their congestion, little or much. Thus in country or nearly flat receivers for lode-stuff, the point of contact of the drain with the receiver is the line of deposit or shoot.

In all positions of gold deposit, however, the greatness or smallness of the same depends on whether or not any such position has received the drainage from short or long extents of unobstructed drains of gold slate, and the value per ton of ore is much or little in accordance with whether it has been deposited in a narrow fracture, Fig. 6, which received much gold drainage, or in a thousand and one small positions spread through wide extents of compound fracture, which received a similar rich drainage, such as is shown in Fig. 7.

All positions of deposit, be they composed principally of sulphides or of quartz, appear to act as filters, and I have noted that it is a mistake to expect to find such a filter, rich in gold, immediately under one that has retained the gold from drainage which passes through both. The greater the extent of the deposit of gold, the greater the area drained to form its make-up. Of course, there have been instances where richness has been met with, not far below another very rich position. Not on the same line of individual drain, however, but in a lode structure which cut through several gold slate drains.

A MAIN DRAIN.

MINING EXPOSITION IN BELGIUM.—In conformity with resolutions passed at the Paris Mining and Metallurgy Congress of 1900, and at the request of the Union des Charbonnages, Mines et Usines Métallurgiques de la Province de Liège, the Liège Engineers' Association has accepted the task of organizing, under the patronage of the Belgian government, a congress of mining, metallurgy, mechanics and applied geology, to be held at Liège, in connection with next year's International Exhibition, in the closing days of June.

A PRACTICAL ROCK-DRILL TEST.

The construction of the Central tunnel at Idaho Springs, Colo., has afforded opportunity of making some interesting tests with rock-drills, and under the direction of Mr. S. A. Knowles, the superintendent, a complete record has been kept of the daily progress of the work. The tunnel was undertaken for the purpose of draining the mines of the Big Five Corporation and adjoining properties. It will also be used as a means of transport. The rock through which it passes is hornblende schist, exceedingly tough and hard. The dimensions of the tunnel are 6 by 9 ft. Throughout its construction two Water Leyner drills have been employed, both of which are of the regular type, without any special features or changes to prepare them for the work.

The record covers the period from July 20, 1903, to June 30, 1904, and shows the number of holes and linear feet drilled by each machine and the hours of work for every day during that time. From the detailed report the following averages are taken:

Average advance of tunnel per shift	7 ft. 5.6 in.
Average time of shift	5 h. 15 m.
Average length drilled per minute, including setting up, etc.	2.64 in.
Cost of drill repairs per shift	$0.383
" " " " each machine	0.106
" " " " per foot of tunnel	0.548
" " " " total for 245 shifts	187.70

During the period the tunnel was advanced 1,930 ft., and a total of 34,244 ft. of holes was drilled. The performance is a creditable one, as can be seen by comparison with other records of rock drills working under similar conditions.

A NEW ENGLISH COLLIERY.—The second shaft of the Dinnington Main Colliery Company, near Kiveton, England, recently reached the coal seam at a depth of 2,004 ft. The sinking of the shaft occupied a period of 23 months. During a considerable part of the time a flow of water, averaging 20,000 gal. per hour, was met and had to be provided for.

NITROGEN COMPOUNDS FROM THE AIR.—At a recent meeting of the Society of Chemical Industry, at St. Louis, J. Sigfrid Edstrom described the methods used by C. Birkeland and S. Eyde, of Christiana, to extract nitrogen from the air. The methods are based on the fact that the current in an electric arc and the arc itself can be deflected by a magnetic field, the deflection being at right angles to the lines of force. An arc thus deviated is broken after a short interval and another is formed. This action may be made so rapid that several thousand arcs are formed in a second, but in the ovens used by the inventors only some hundred arcs per second are used. If the arc is fed by direct current and the magnetic field by single-phase alternating current, the arcs vibrate in a plane, at both sides of the electrodes. The arcs are formed, carried outward and extinguished so rapidly that to the eye they appear as a disk of arcs. The efficiency obtained in practice is 900 kg. HNO_3 per kw.-year. There are, however, losses of energy in other parts of the apparatus; moreover, the power is not the only item of expense. The air coming from the oven contains about 2 or 3 per cent of NO; in order to be utilized it must be transformed into NO_2. This is done in a reaction tank of thin sheet iron enamelled on its inner side. The process is stated to have been put into actual operation and compounds of nitrogen have been manufactured.

QUARTZ VEINS IN NEW ENGLAND.

From time to time, for many years past, there have been gold mining excitements in New England, based upon the existence of quartz veins containing, or supposed to contain, gold. In the last year or two there has been some revival of the reports of the existence of gold, and several companies have been organized to work mines. During the field season of 1903 Mr. George Otis Smith, a member of the United States Geological Survey, visited two localities where search for the yellow metal was being prosecuted, and he has recorded the results of his observation in an article in the Survey's recent bulletin: 'Contributions to Economic Geology, 1903.'

One of these districts is in western Maine and the other is in southern Vermont. Though separated by approximately 135 miles, the two districts have some points of similarity. The veins occurring in both places are believed to be typical of the ore deposits that occur throughout this region.

The mining property in Maine upon which the most development work has been done during the past year is situated in Milton plantation, in Oxford county. A group of high hills which here encroaches upon the valley of Androscoggin river includes Mount Zircon, the most prominent height of the vicinity, and Mount Glines, a somewhat lower knob, on the slopes of which the mining work has been done. The northernmost of the quartz veins prospected on Mount Glines is a well-defined fissure vein composed of quartz and varying amounts of talcose material. The sulphides, galena and pyrite, occur in scattered bunches in the vein, which varies in width from 4.5 ft. to less than 2.5 feet. Several smaller veins have been located on the same slope of Mount Glines, but these are not worked. Vein No. 6 is being developed by a shaft. This vein is similar in composition to No. 1. A thickness of over 6 ft. is exposed. The ore minerals are galena and pyrite, which occur both in bunches and in a fairly distinct streak, 4 in. wide, near the northern side of the vein. Assays from the Mount Glines property have been reported as indicating values ranging from $7.50 to $49.68 a ton. These assays were doubtless made of picked material. Samples taken by Mr. Smith and assayed by Mr. E. T. Allen in the Survey laboratory show not even a trace of gold. All the assays indicate that the ore is in no sense gold-bearing, and even in the best assay the silver content is no greater than is to be expected in a galena ore. Further development is required to determine whether these veins contain copper and lead in profitable amounts.

In the town of Pittston, Kennebec county, Maine, prospecting for gold has been carried on for many years. The development here is in the pegmatitic veins, sheets and masses in the mica-schist of the region. Assays made of picked samples from the principal opening in the pegmatite showed no traces of either gold or silver.

Mr. Smith's observations in Vermont are like those which he made in Maine. Within the last 50 years more money seems to have been spent on mining operations in the town of Plymouth and Bridgewater than has been realized from these efforts. Since 1859 work has been done, at various times, on the Taggart vein near Bridgewater. Ore has been taken out here that was reported to yield $32 in gold to the ton. Assays made in the Survey laboratory indicate a value of over $6, but the sample assayed represents the richer part of a small orebody. All the value is in silver, copper, and lead. The absence of gold is suggestive, in view of the high gold values claimed for this vein.

The only gold known to have been mined at anything like profit in southern Vermont is that found in the gravel deposits of Plymouth, and the extent to which that mining was profitable is doubtful. The essential feature in the question of the occurrence of gold in Vermont is the economic value of the deposits. That is at least sufficiently well understood to make extravagant speculation entirely unwise.

THE SUCTION GAS PRODUCER.

The gas producer used in connection with the gas-engine described in the Journal of September 15 has some special features worthy of attention. This device, called by the makers —the Weber Gas & Gasoline Engine Company, of Kansas City, Mo.—the suction gas producer, consists of three cylindrical shells of steel plate riveted and caulked. The first one in the illustration is the furnace, and is mounted over a cast-iron ash-pit lined with fire-brick and fitted with a feeding hopper and a small hand-blower; the second cylinder is also on a cast-iron base, and has a cast-iron top bolted on; the third, or smaller cylinder, is a gas receiver, intended to hold an accumulation of gas which the engine draws upon for power purposes. The cylinders are connected by pipes, and the gas is taken direct from the receiver by a pipe to the engine, where it is compressed and ignited as in any ordinary gas-engine.

The operation of the producer is simple. A fire is kindled first on the grate in the furnace, the fuel fed from the top, and the fire blown to incandescence by means of the hand-blower. This furnishes the first gas, upon which the engine is started. The use of the blower is discontinued when the engine begins to work, as the vacuum caused by the pistons taking gas from the receiver draws free air into the fire through an orifice in the ash-pit door, thus keeping the supply of gas in accordance with the load on the engine. The gas generated in the furnace is conducted to the second cylinder, or scrubber, entering at the bottom, where it passes through a water bath and then through charcoal, or coke, kept damp by a jet of water from the top. When thus cleansed the gas passes into the receiver, from which it is drawn into the engine as required. The automatic stoker keeps the furnace constantly supplied with the fuel, and the ashes which drop through the grate can be readily removed through the ash-pit door without disturbing the operation of the producer.

In order to secure the highest efficiency possible with producer gas, the mixture is enriched by the addition of a small quantity of steam. This steam is provided by allowing a small jet of water to feed into the exhaust of the engine at the ports. The steam generated there is then piped to a point under the fire in the furnace, where it condenses as minute particles of water before entering the incandescent fuel. Producer gas, while admitted to be the lowest energy, can be made more cheaply per unit of heat than any other.

Charcoal is used as fuel in the plant shown at St. Louis, but equal economy has been attained in similar plants with anthracite coal, coke and lignites of varying qualities.

Aside from fuel economy a number of advantages are claimed for this plant. The entire space occupied by one of 150 h.p. is 20 by 20 ft. The first cost of installation would be about the same as steam-power, but a large economy is realized in fuel and labor. One man can attend a plant of any size, even up to 1,000 h.p., and repairs and maintenance should be below the cost in the steam plant. There are no working parts in the producer aside from the automatic stoker, and that consists of a casting which can be removed at small cost; the grates and the fire-brick lining of the furnace can be counted on to last a long time in constant service. The water consumption for the producer is very small; that for cooling purposes in the water jackets of the cylinders is the same as in any other gas-engine, with proper facilities, such as a cooling tower, only the water loss in evaporation could be counted as a total loss. Other points claimed are readiness for operation, as the engine can be started in a few minutes; there is also economy of fuel when the engine is not running. As the producer will hold fire for a long time with a very small fuel consumption, and indeed can be left from 24 to 48 hours without any attention, and the engine can be started immediately upon fanning gas into the receiver by means of the hand-blower.

BOOKS REVIEWED.

The Black Hills Illustrated. Compiled by George P. Baldwin. Deadwood, South Dakota: published by the Black Hills Mining Men's Association. Pages, 208; illustrated.

This is a profusely illustrated volume, setting forth the mineral and other resources of the Black Hills district of South Dakota. The matter has been selected with judgment, and the varied claims of the region to consideration, with the reasons for its past and present prosperity, are well stated. The illustrations are generally good, and make the volume attractive. We need hardly say anything at this date about the importance of the Black Hills from a mining point of view. What is to be said, is well set forth in the book before us.

Tables for Chemical Calculations. By Horace L. Wells. New York: Henry Holt & Company. Pages, 60. Price, $1.

This book has been prepared to facilitate chemical calculations by the use of logarithms; and it seems well suited to save the chemist much work. The tables are based on the atomic weights adopted by international cooperation, and generally accepted as the most reliable ones. It is evident that a great deal of care has been used in their preparation, and they are clearly presented, with condensed rules and directions for their use. It is, of course, impossible to make any criticism of such a volume until it has been tested by use; but it seems to be a book which will be of great service to the chemist whose work requires much calculation, and to whom accurate results are of importance.

Geological Survey of Alabama. Index to the Mineral Resources of Alabama. By Eugene A. Smith and Henry McCalley. Montgomery, Ala.: State Printers. Pages, 80; with maps and illustrations.

As the name implies, this document is intended rather to direct the attention of those interested to the various natural resources of

the State which are considered capable of being profitably utilized, and to the sources from which more detailed information may be derived, than to be a complete or adequate presentation of the subject. It contains interesting condensed monographs on coal, on iron ores and on the minor mineral resources, such as cement materials, clays and other structural materials, phosphates, road-making stones and a great variety of products, or rather minerals capable of economic use. It gives a great deal of information in condensed form, and is an excellent guide or manual to those who wish to investigate the resources of the State.

Architect's and Builder's Pocket-Book. Fourteenth Edition. By Frank E. Kidder. New York: John Wiley & Sons, 1904. Pages, 1460; illustrated. Price, $5.

It is scarcely necessary to review in detail this excellent handbook. The first edition was completed nearly 20 years ago, and since then the work has been revised from time to time to keep pace with the growth of the arts it aims to cover. For this edition a complete and thorough revision of the book was entirely re-written, the author intending to prepare a reference book which should contain some information on every subject, except design, likely to come before an architect, structural engineer, draughtsman or builder, including data for estimating approximate cost, which should cover architectural engineering as thoroughly as is practicable in a handbook, and should present all information in simple and convenient form. Particular attention has been given to the needs of the structural engineer, since, with the enormous increase in the use of steel, concrete and other fireproof material in building, the architect must now have a knowledge of many things which were formerly chiefly in the field of the civil engineer. To include all this new data the book has been considerably enlarged, but, as the author points out, this will not impair the value of a work consulted at the drawing table. Only persons who have undertaken to compile accurate data on any subject can appreciate the amount of time such a revision requires. With the author it was undoubtedly a labor of love that will bring him the thanks of all men in his calling.

Reinforced Concrete. By A. W. Buel and C. S. Hill. New York, 1904: *Engineering News* Publishing Company. Pages, 434; illustrated. Price, $5.

This book deals with a subject that has rapidly become of much importance, not only in connection with the question of fireproof construction for buildings, but also in connection with bridge design. The great fire at Baltimore gave concrete construction a most thorough test, and it is safe to say that the use of reinforced concrete will increase even more rapidly in the next four years than in the past decade.

The authors of the present volume have aimed to produce a book that shall take up the subject in a way which will appeal to designing and constructing engineers who are governed by the conditions of American practice. Following this intent the authors have omitted theoretical discussions and replaced these by examples of representative structure, and records of actual practice in the selection of materials and of methods of workmanship and construction.

The book is divided into three sections. Part I gives working formulas for the calculation of all classes of structures in reinforced concrete and steel, and such facts about the properties of concrete and steel as are necessary in developing economical engineering designs; Part II contains illustrations and descriptions of a large number of representative structures of reinforced concrete, showing the adaptability of the material to various types and forms of structures, and in Part III particular attention is given to the construction of centers and forms, and to methods of facing and finishing exposed concrete surfaces.

The authors acknowledge indebtedness to various periodicals for matter used, and to the papers of civil engineering societies for material used. The selections have been made with judgment, the illustrations are commendably clear, and the book should find favor with architects and engineers.

BOOKS RECEIVED.

In sending books for notices will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of this JOURNAL.

Irrigation in Northern Italy. By Elwood Mead. Washington: Government Printer. Pages, 100; with map and illustrations.

United States Geological Survey. Production of Lead in 1903. By Charles Kirchhoff. Washington: Government Printer. Pages, 16.

The Causes of High Prices. Prepared by the Massachusetts Bureau of Statistics, Chas. F. Pidgin, Chief. Boston: State Printers. Pages, 50.

Reinforced Concrete. By A. W. Buel and C. S. Hill. New York: *Engineering News* Publishing Company. Pages, 434; illustrated. Price, $5.

Spanish-English Dictionary of Mining Terms. By Frederick Lucas. London, England: the Technology Institute. Pages, 80. Price (in New York), $1.75.

Irrigation and Drainage. Investigations of the Office of Experiment Stations Department of Agriculture. By R. P. Teele. Washington: Government Printing Office. Pages, 24; illustrated.

Geological Survey of Western Australia. Geology and Auriferous Deposits of Leonora. By C. F. V. Jackson. Perth, W. A.: Government Printer. Pages, 48; with maps and illustrations.

Geology Applied to Mining. For Mining Men and Students. By Josiah Edward Spurr. New York: THE ENGINEERING AND MINING JOURNAL. Pages, 328; illustrated. Price, in cloth, $1.50; flexible leather, $2.

Report of the United States Naval Liquid Fuel Board of Tests Conducted on the Hohenstein Water-tube Boiler. Prepared under direction of the Engineer-in-Chief. Washington: Government Printing Office. Pages, 452; illustrated.

PROSPECTING FOR COAL IN NEW SOUTH WALES.—It is stated that a bore put down at Cessnock, near Maitland, New South Wales, recently penetrated, at a depth of 260 ft., a seam of coal 27 ft. in thickness, so that the further progress of the bore is being watched with interest.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Mining Exhibits.

Sir—The remarks of Mr. Merrill, in the JOURNAL of September 29, on the effective presentation of State exhibits, are sensible, and contain much that those in charge at future expositions will do well to bear in mind. There is one point, however, which he passes over rather lightly, upon which more emphasis might be placed. That is the use of models of mines and surface plants.

The scientist may be inclined to look down upon these as mere toys, intended only to catch the eye. The object of an exhibit, however, is to instruct the outsider—the plain man, that is the general public—as well as the specialist. For this purpose models are excellently adapted, while the average mining engineer is more interested in them than he would, perhaps, like to confess. The model serves the same purpose that a drawing, a diagram, or a well-prepared table often does in an article or a book. It conveys to the mind at once an impression, often more clear and definite than a long printed description could give.

Excellent examples of this are found at St. Louis. Among these might be named the models shown by several large coal companies. Especially good are those of the Pittsburg Coal Company, in which I include the one in the Transportation Building, as well as those in the Mines Building. The Kentucky exhibit also includes a good one. The best and most carefully prepared examples, it seems to me, are those in the admirable exhibit made by Japan.

Beyond all question the finest exhibits in St. Louis are those of the Pennsylvania and the Baltimore & Ohio railroad companies, in the Transportation Building, the former showing the standards of present day railroading, the latter its growth and development from the first beginning. In both, free use is made of models, as well as of actual locomotives, cars and the like. It probably would have been too much to expect such collections in mines or metallurgy; though the United States Steel Corporation might have done something quite as good in iron and steel metallurgy if it had taken part at all, which it did not.

I have said quite enough on this point for your columns; but I think many visitors to our latest and greatest exposition will agree with me. OBSERVER.

Brooklyn, N. Y., Oct. 1, 1904

PLATINUM COMPOUNDS.—According to investigations made by the German chemist Lothar Wöhler (*Zeitschrift anorganische Chemie*, 1904, p. 423), platinum forms only two chemical compounds with oxygen, which are the dioxide PtO_2, with its various hydrates of different colors, and the monoxide PtO, with its hydrate. The hydrates PtO_2, $3H_2O$, Pt_3O_4, $9H_2O$ and Pt_5O_{11}, $11\ H_2O$ consist of the hydrated dioxide rendered more or less impure by mixture with the basic nitrate. The tetroxide Pt_3O_4 and the sesquioxide PtO_3, according to the same authority, are mixtures of the dioxide and monoxide.

ABSTRACTS OF OFFICIAL REPORTS.

Lehigh Valley Coal Company.

This company is the organization which operates the anthracite coal properties controlled by the Lehigh Valley Railroad Company. The report is for the year ending June 30, 1903. The details of cost, receipts, etc., which have been given in previous reports, are this year omitted, for reasons easily understood.

The capital stock of the company is $2,400,000, and is owned by the Lehigh Valley Railroad Company. The funded debt is $21,812,000, of which $8,244,000 is owned by the company.

The net income for the year was $856,437, a decrease of $39,481, as compared with the previous year. The deductions were $31,117 for settlement of miscellaneous accounts, leaving a balance of $825,320. Adding $1,701,681 brought forward from preceding year, made a total surplus of $2,527,001. The net earnings were 11.4c. per ton of coal handled.

The total production of anthracite coal from lands owned and controlled by the company was as follows, in long tons:

Mined by:	1902-3.	1903-4.	Changes.
Company.....	3 531.677	4,275,131	I. 743,454
Tenants of Co	1,280,416	1,667,957	I. 387.541
Controlled Cos.....	1,123,924	1,568,870	I. 444,946
Total.....	5,936 017	7,511,958	I. 1,575,941

The report says: "The collieries operated by the Lehigh Valley Coal Company and affiliated coal companies produced during the year 51.73 per cent of the coal transported by the Lehigh Valley railroad, being a decrease of 5.04 per cent compared with the previous year.

"From the operations on the Snow Shoe property there were mined 169,577 tons, as against 314,195 tons the previous twelve months.

"Improvements and additions made to the various collieries during the year amounted to the sum of $410,680. During the coming year a larger amount of money will be expended for such work in order to put the property on a basis which will admit of the most economical operation. Since the close of the year, and after careful consideration of what additional improvements should be made during the fiscal year 1904-5, the Lehigh Valley Coal Company board has deemed it advisable to transfer from income account for this purpose the sum of $500,000.

"The advance royalty account shows an increase of $122,993; yet this amount is considerably less than that of the previous year, $160,208, which, in turn, was considerably below that for the year 1901-2. The increase on this account will cease within the next few years with the improvement and development of the coal properties."

The Lehigh Valley railroad carried during the year 11,694,151 tons of coal. The ton-mileage of coal was 1,765,612,493, showing an average haul of 151 miles. The earnings from coal carried were $12,835,076, being 51.7 per cent of the total freight earnings of the road. The average receipts on coal hauled were, therefore, 0.727c. per ton-mile.

Homestake Mining Company.

This company owns a large group of mines in the Black Hills in South Dakota. The property is one of the most extensive deposits of low-grade gold ores known. The latest report is for the year ending May 31, 1904.

The total ore mined and treated in the mill was 1,290,057 tons. The accounts are stated in considerable detail, but in such a form that it is difficult to separate the items and assign them to their proper department. The following statement shows the working account, analyzed as carefully as possible:

	Amount.	Per Ton.
Bullion account	$4,800,558	$3.69
Miscellaneous	165,193	0.13
Total earnings	$4,965,751	$3.82
Mining	$2,323,648	$1.79
Milling	768,840	0.59
Cyanide expenses	322,918	0.25
General and miscellaneous	335,419	0.26
Interest and taxes	123,772	0.09
Total expenses	$3,874,597	$2.98
Net earnings	$1,091,154	$0.84

Miscellaneous expenses include costs of foundry and machine shop, with other charges belonging partly to the mine and partly to the mill.

The income account, including all receipts and disbursements not given above, may be stated as follows:

Net earnings, as above	$1,091,154
Bills payable	200,000
Total receipts	$1,291,154
Debit balance from previous year	$425,785
Purchase of property	210,169
Dividends paid	655,200
Total charges	$1,291,154

The report of the superintendent, T. J. Grier, says: "At the close of the fiscal year everything about the company's property is running smoothly. No mishap of great importance occurred during the period. Development of the mine progressed steadily and satisfactorily. The 1,100-ft. level reached a year ago in the Ellison shaft has been opened sufficiently to show that the ore vein being worked above that level continues to it, and also holds its width at that depth, while the shaft has been sunk to 1,250 ft., where the next level will be opened.

"The 100-stamp addition to the Amicus mill, referred to in the report made a year ago, will start next month, and give to the company an even thousand stamps. The plant generally is in fine condition, with an ore reserve sufficient to keep it busy for a great many years."

COBALT IN ARGENTINA.—At the Reina Alejandra mine, in the province of Riojà, a deposit of cobalt ore is being worked which ranges from 2.5 to 4 ft. in thickness. A shipment of 150 tons of ore to Europe averaged 3 to 4.5 per cent cobalt, and 10 to 20 grams gold per ton, besides a little nickel and silver. The ore brings from $60 to $85 per ton at the smelter.

NEW ZEALAND COAL OUTPUT.—The total production of coal and lignite, including 36 tons of oil shale, in 1903, was 1,420,229 long tons, an increase of 55,189 long tons over 1902. The West Coast district produced 781,032 long tons in 1903; the Southern district 429,402 tons and the Northern district 209,795 tons. The largest individual producer was the Westport Coal Company, Ltd., 565,191 tons.

Limestone and dolomite cannot be distinguished by ordinary physical tests. In some cases limestone from a certain district will have a different color or will be coarser or finer in grain than dolomite from the same district, but the distinction will not hold good for the rocks of other districts. The best way to identify these rocks is to test with dilute hydrochloric acid. A drop of the acid on limestone causes a lively effervescence, while dolomite will be only slightly attacked, if at all.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc. Preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Molybdenite.—A friend of mine advises that he has discovered a deposit of molybdenite. What market is there for this mineral?—H. W.

Answer.—Lately there has been energetic prospecting for molybdenite as a result of high prices, but momentarily the supply rather exceeds the demand. Ore to be marketable among manufacturers of metallic molybdenum, ferro-molybdenum and nickel-molybdenum, which are used in the preparation of special steels, should contain at least 45 per cent molybdenum, and be free from copper. At present it would be difficult to sell even a 50 or 55 per cent ore, and offers have been solicited by sellers at as low as 20 to 25c. per unit ($180 @ $237.50 per long ton, f. o. b. New York) for mineral averaging 95 per cent molybdenum sulphide. The consumption in America is chiefly satisfied by the small production in Arizona and New Mexico, and by imports from Norway and Canada. Prior to the war in the East high-grade ore was offered by Japan at 40c. per unit, and although a small quantity was imported, the trade has ceased, at least for the present. Leading dealers and consumers are E. P. Earle, 29 Liberty Street, New York, and the Mineral Products Manufacturing Co., Wilmington, Delaware.

Rand Statistics.—I would thank you to publish some data relative to (1) the assay value of the ore mined in the Transvaal; (2) quantity of ore cobbed out as too low grade to treat; (3) actual yield per ton by treatment; and (4) dividends paid.—S. M. E.

Answer.—Briefly, your inquiries may be answered by the reports for 1903 of the Rand Mines, Limited, the Robinson Gold Mining Company, the Bonanza, Limited, and the Crown Reef Gold Mining Company. These properties have contributed nearly one-third of the gold output of the Rand last year. In the answers given below, figures showing the mean and extreme are used in order to convey a general idea of the operations on the Rand. Details of the workings of the many companies in the Transvaal cannot be mentioned here, owing to limited space. Full descriptive articles on the Witwatersrand are constantly being published in the Journal, and recently the question of valuing mines has become an interesting topic for discussion.

1. The value of ore before crushing, as determined by mill yield, plus assay value of pulp leaving mill, varies from 8.212 fine dwt. gold per short ton on the Rose Deep, to 16.816 dwt. on the Bonanza, Ltd. The assay value of pulp from mill is 4.158 fine dwt. per ton for the former property, and 7.862 dwt. for the latter.

2. There was sorted as waste at the Robinson 24.708% (assay value 1.215 dwt. gold per ton) of the total quantity of rock handled in 1903; Crown Reef, 21.3% (0.757 dwt. per ton); Bonanza, 12.06% (0.974 dwt. per ton); Geldenhuis Deep, 9.24% (1.317 dwt. per ton), and at the Rose Deep, 2.20% (0.663 dwt. per ton).

3. The actual yield of gold per ton of ore treated was: At the Bonanza, 15.482 fine dwt. (extraction, 92.06%) from 97,180 tons; Robin-

son, 13.762 dwt. (84.833%) from 209,933 tons; Crown Reef, 13.097 dwt. (93.32%) from 162,315 tons; Geldenhuis Deep, 8.204 dwt. (83.94%) from 273,770 tons, and Rose Deep, 7.069 dwt. (86.08%) from 219,750 tons. For the nine deep level companies in the Rand Mines, Ltd., the average yield from 1,543,542 tons ore treated was 8.146 fine dwt. per ton, showing an average extraction of 88.11 per cent. Working costs were $5.44 per ton at the Rand Mines, $6.62 at the Bonanza, and $6.75 at the Crown Reef.

4. Estimates vary as regards the total dividends paid by the mines in the Transvaal in 1903; one authority puts the figure at about $20,000,000 for 31 companies. The rate paid fluctuated from 5 per cent to 187.5 per cent on capitalization. Based on the tonnage treated, the dividends paid by the Crown Reef Gold Mining Company, which declared 130 per cent on its capital, amounted to $4.80 per ton of ore milled, while the Bonanza, Ltd., disbursing 100 per cent on its capital, showed an average of $10.29 per ton of ore crushed.

COAL IN PRUSSIA.—During the first half of the current year there were 270 coal pits in operation in Prussia, employing 445,683 persons. The aggregate production of coal from Prussian mines during the six months is returned at 54,905,789 tons, comparing with 51,610,818 tons in the corresponding period of last year, an increase of 3,294,971 tons, equal to 6.38 per cent. The principal district is, of course, that of Dortmund, where there are 161 pits in operation, employing 269,218 persons.

TRANSMISSION AT 80,000 VOLTS.—In a paper read at the annual convention of the Pacific Coast Electric Association, A. C. Balch described an experimental transmission line, 16 miles long, that was erected to test insulators. The type selected was to be used on the 125-mile Kern river line, that would deliver 10,000 h.p., the working pressures to be 45,000 volts at the power-house and 40,000 at Los Angeles. The experimental line had three No. 4 copper wires mounted in triangular form, with a distance of 40 in. between wires. By two single-phase 40,000 volt 400 kw. transformers, arranged in series, an average of 80,000 volts was maintained between two of the wires and the third wire. During the test, which lasted two months, through all kinds of weather, some phenomena attracted especial attention. One was a sharp buzzing or rattling sound that could be heard 300 ft. from the line, which seemed to be localized at points along the wire, but never could be placed; sometimes it seemed as though neighboring objects extending from the ground, as trees and poles, made greater noise apparent near them. A reduction of 25 per cent in the voltage stopped the noise. The line was actually luminous on a dark night, or when looking toward a dark background on any night, each wire appearing like a stream of bluish light of uniform brightness, 3 in. in diameter; the single wire was brighter than the other two. In extra dry weather this luminosity was visible half a mile or even a mile from the line, and surrounding objects were illuminated enough to cast perceptible shadows. A telephone line about 6 ft. below the cross-arm was so charged that it would light a 32 c. p. lamp of half-candle power when connected directly between the combined telephone wires and ground. On open circuit, either of the telephone wires would discharge a 4-in. spark to ground terminal. In spite of this the telephone could be operated easily by any one willing to chance the conditions of static charge. This was only tested by standing on insulated stools, and not used for regular work. There was no trouble in throwing the current off or on because of fogs or bad weather.

As a result of the tests, the company adopted large brown porcelain insulators made in four sections. By having the lineman wipe out the insulators once or twice a year the company expects to transmit 60,000 volts without difficulty.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

MINING RIGHTS AFFECTED BY ENLISTMENT IN SPANISH WAR.—The law of the United States (Section 2324, page 1426) provides that for failure to do annual assessment work mining claims become liable to forfeiture and relocation, but if the original owner resumes work before relocation his rights are revived. Another section provides that the foregoing section shall not apply to volunteers in army or navy in the war with Spain, and that those desiring to take advantage of the act shall file a notice of their enlistment, and desire to hold the claim under the act, in the office of the clerk where location certificate is recorded. The filing of such certificate is equivalent to actual performance of the assessment work, so as to revive claimant's rights, forfeited by failure to the assessment work of the previous year, where no one else had located there in the meantime. Where parties wrongfully hold possession of a mining claim adversely to one who had made a prior location, and prevented him from performing the required assessment work, they cannot set up his failure to support their title against him. Nor can defects in their location certificate be cured by filing amended certificate after he had re-entered.—Field v. Tanner, (75 Pacific Reporter, 916), Supreme Court of California.

PATENTS RELATING TO MINING AND METALLURGY.

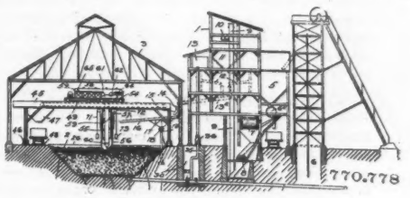
UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending September 27, 1904.

770,781. MACHINE FOR SEPARATING, GRADING AND POLISHING.—Charles T. Rowland and Lewis F. Longmore, Lowell, Mass., said Longmore assignor to said Rowland. The combination of a series of perforated hollow cones, means of introducing granulated materials into the smaller end of the first cone of the series, trunks connecting the larger end of each cone, except the last, with the smaller end of the next following cone, means of rotating said cones to discharge the finer portions of said granular material through said perforations and to cause the materials too coarse to pass through the perforations of any cone to pass through said cone, as many air-tight jackets as there are cones, each jacket surrounding one of said cones, and separate discharging means for each of said jackets.

770,778. METHOD OF TREATING AND HANDLING COAL FOR COKING PURPOSES.—William J. Patterson, Pittsburg, Pa. The method of treating and handling coal preparatory to coking, consisting in storing the coal and water in one entire mass directly

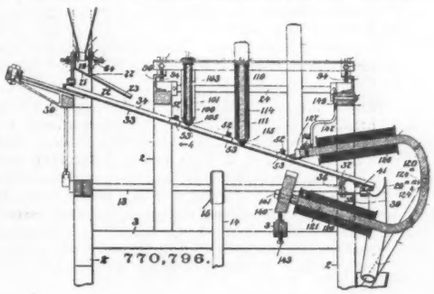


as they come from the washers, permitting the mass so stored to remain in a substantially quiescent state until the water delivered therewith percolates down through the mass of coal, depositing the sludge throughout the mass, carrying off the water from below, and removing the coal from the top of the mass.

770,783. VALVE FOR AIR-COMPRESSORS.—Edwin H. Steedman, St. Louis, Mo. In a valve for air-compressors, the combination with a cylinder-head, of a valve-seat introduced from the cylinder side of said head, and a bolt for securing the same in position, said bolt extending to the exterior and having an opening in its outer end for the introduction of a lubricant.

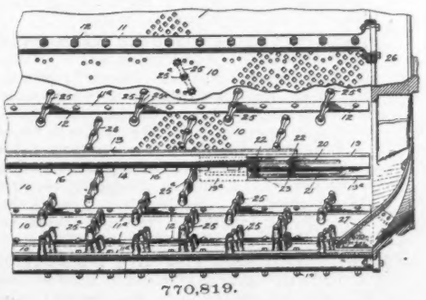
770,784. PRESSURE CONTROL FOR AIR-COMPRESSORS.—Edwin H. Steedman, St. Louis, Mo. In a pressure control for air-compressors, the combination with a suction-valve seat whose hub portion forms a guide, of a thimble having projections disposed around said hub portion to coöperate with the valve, and a spring housed in said thimble and seated against said hub portion.

770,796. APPARATUS FOR SEPARATING ORE.—Henry F. Campbell, Boston, Mass., assignor, by direct and mesne assignments, to National Magnetic Mineral Separating Company. The combination in a magnetic separator, of a magnet; means, presenting an unobstructed surface at a due distance below the magnet, for supporting and conveying the material



under and past the magnet, and through an interrupted field of such magnet, and to pass it, spread in a film of substantially uniform thickness on the surface beneath the magnet, and means for causing the particles of ore to be mechanically agitated under the magnet in a direction other than that of the travel of the ore.

770,819. COAL-BREAKER.—William J. Patterson, Pittsburg, Pa., assignor to Heyl & Patterson, Pitts-



burg, Pa. In a coal-breaker, the combination of a rotary cylinder, a shelf extending longitudinally thereof and means for varying the length of said shelf.

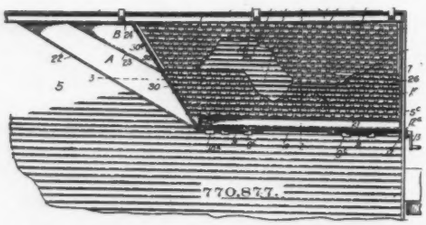
770,785. PRESSURE CONTROL FOR AIR-COMPRESSORS.—Edwin H. Steedman, St. Louis, Mo. The combination with the cylinders of a duplex single-

acting air-compressor, of separate hollow cylinder-heads arranged thereon, a suction-chamber in each of said heads, said suction-chambers communicating with each other between the two heads, a suction-chamber in the walls of the cylinders also in communication with the said suction-chambers in the heads, a suction-valve in each suction-chamber, which valve is introduced from the cylinder side into the inner wall of the cylinder-head, and a common means for stopping the operation of said suction-valves.

770,851. MANUFACTURE OF ARTIFICIAL FUEL.—Pauline Grayson, London, England. A process of manufacturing artificial fuel, consisting in mixing coal, sand, plaster-of-paris, sawdust, lime, water, mineral oil, pitch and resin, the dry ingredients being first mixed, then separated into two equal portions, the two portions being separately incorporated, the one with oil and the other with water and afterward intermingled with pitch and resin.

770,857. GUIDE-SHEAVE FOR HOISTING APPARATUS.—James W. Hollenbeck and William E. Palmer, San Francisco, Cal. The combination with a hoisting apparatus, of a rope, means for driving said rope, a sheave over which said rope passes intermediate of its ends, boxes carrying a support which is turnable substantially parallel with and above the normal line of travel of the rope, convergent arms fixed to the support and a pin upon which the sheave is turnable.

770,877. CLASSIFYING OR SIZING APPARATUS.—August T. Winkel, Denver, Colo. A classifier or sizer comprising a transversely-inclined riffled table, djoining screens running lengthwise above said



table, a third screen located above said screens, a partition located on said table underneath the division line of said adjoining screens, cleats on said table supporting said screens, the distance between said screens and the table exceeding the height of the riffles.

770,882. MINE TRACK SYSTEM.—Joseph Whitehead, Farmington, Ill. In a mine track system, the combination of a rail, a switch-plate located intermediate the ends of such rail and provided with slotted portions, a short rail-section integral with the switch-plate and abutting with one end of the main rail, and integral rail-section formed upon the switch-plate having a straight portion, and a converging portion, and the switch-plate between its integral rail portions having a beveled or tapered upper face.

770,910. COOLING DEVICE FOR BLAST-FURNACES.—Ludwig Keyling, Berlin, Germany. In a cooling device for blast-furnaces, the combination of a box, in which the upper opening of the furnace is situated a plate situated in this box vertically above the upper opening of the furnace, the diameter of this plate being larger than the upper opening of the furnace, so that the edge of this plate projects sidewise over the opening of the furnace, a water-nozzle situated vertically above the plate, an annular channel situated around the top part of the furnace in the box and means for connecting this channel with the outside.

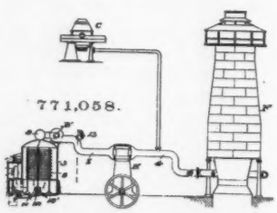
770,963. PROCESS OF BLEACHING BARYTES AND RECOVERING GLAUBER SALT.—William D. Gilman, Sweetwater, Tenn. Process for bleaching barytes and recovering Glauber salt which consists in mixing the crushed or ground barytes ore with a solution of niter-cake; heating the mixture to dissolve the impurities; drawing off said solution and washing the ore with hot water; adding to said solution and wash-water an alkaline solution of sodium to precipitate the impurities and leave Glauber salt in solution; and finally concentrating the resulting solution and allowing the Glauber salt to crystallize.

770,997. APPARATUS FOR THE PRODUCTION OF TUBES.—Arthur E. Beck and George Townsend, Birmingham, England. In the manufacture of tubes direct from molten or plastic metal, the combination consisting of an operating cylinder or chamber, a central cooling-core, a mandrel within said core and reciprocating independently thereof, a mould formed by the said cylinder the core and mandrel for the reception of the molten or plastic metal, and an annular ram reciprocating in the said mould whereby the said metal is subjected to repeated compressive workings and gradually carried step by step through the mould and discharged therefrom in a continuous length.

771,024. MANUFACTURE OF WHITE LEAD.—Jacques Oettli, Lausanne, Switzerland, assignor to The Syndicat pour l'Exploitation des Inventions du Professeur Oettli, Berne, Switzerland. A process of making white lead, which consists in electrically dissolving a lead electrode by a continuous current not exceeding one ampere per square decimeter, reversed at definite intervals, in an electrolyte formed of a solution of common salt of 1 per cent and of a temperature of about 15°C.

771,025. MANUFACTURE OF ZINC-WHITE.—Jacques Oettli, Lausanne, Switzerland, assignor to the Syndicat pour l'Exploitation des Inventions du Professeur Oettli, Berne, Switzerland. A process of making zinc-white, which consists in subjecting zinc plates to the action of electrolysis in a solution of one per cent sodium sulphate of a temperature of approximately 60°C. obtained by means of a current of 10 amperes per square decimeter.

771,058. METHOD OF EXTRACTING MOISTURE FROM AIR FOR BLAST-FURNACES OR CONVERTERS.—James Gayley, New York, N. Y. A method of feeding the air-blast to blast-furnaces or converters which consists in feeding the air into a re-



frigerating chamber, distributing it therein in a current directed successively in varying directions, artificially cooling the air in the chamber to reduce its moisture to a small percentage, supplying the dried air to a blowing engine, and feeding the dried air therefrom under compression into the furnace or converter.

771,062. PROCESS OF MANUFACTURING ARTIFICIAL STONE FROM MAGNESITE.—Carl Groyen, Bonn, Germany. A process of manufacturing artificial stones from magnesite and hydrochloric acid which consists in mixing magnesite in any form or condition with strong concentrated hydrochloric acid, neutralizing the resultant mixture with magnesite and ammonia and incorporating suitable fillers with the mixture.

771,069. CHUTE FOR DREDGING-MACHINES.—Michael Herron, Bordentown, N. J. A delivery chute comprising a main section, a plurality of sections composing a second section forming an extension of said main section and operatively connected therewith, and independent pivotally-mounted means for supporting said second section, whereby it may be laterally deflected.

771,075. SEPARATION OF MINERAL SUBSTANCES BY MEANS OF THE SELECTIVE ACTION OF OIL.—Cosmo Kendall, Upper Norwood, England. A process for the treatment of finely-divided material for the separation of graphitic substance contained therein from associated rocky matter or gangue, consisting in mixing said material with water, bringing said material intimately into contact or thoroughly mixing it with suitable pure thin oil, as kerosene or paraffin oil, projecting at a considerable velocity the mixture so produced under the surface of a volume composed of said material, water, and oil, allowing oil and graphitic substance adhering thereto to pass upward to said surface, and drawing off from said surface oil and graphitic substance immediately on arrival at said surface.

771,080. MANUFACTURE OF ACID-PROOF AND IMPERMEABLE CEMENT.—Richard Liebold, Weimar, Germany. A process of making acid-proof and impermeable cements, which consists in adding to ready-burnt but not ground cement a mixture of wax and caustic lime dissolved in boiling water, and then grinding the same.

771,107. ORE WASHING OR CONCENTRATING MACHINE.—Enos A. Wall, Salt Lake City, Utah. An ore-concentrating machine or table adapted to receive actuating impulse from the head end, in combination with an operating rod or bar attached to the head of the table, a buffer-bar through which the rod passes, a spring on the rod at the inner side of said buffer-bar and a buffer-block secured to the rod or bar at the outer side of the buffer-bar or timber to receive and resist the impact of the spring and suddenly stop the forward movement of the table at its head end as it moves in the direction of the tail, and means for retracting the operating rod against the spring and suddenly releasing it.

771,125. CEMENT-TESTING MACHINE.—Arthur W. Cash, Newark, N. J. In a cement-testing machine, the combination with the lever-like beam and means for clutching the opposite ends of the briquet and transmitting the resistance to rupture to said beam, and a weight-receptacle in connection with said beam and adapted to receive the weights for measuring resistance to rupture, of a separable initial-straining weight arranged in connection with the said receptacle and adapted to hold the clutching-jaws positively, with a predetermined straining power, to or upon the briquet preliminary to the feeding of the measuring weights into the said receptacle,

771,183. PROCESS OF MANUFACTURING MATERIAL DESIGNED FOR THE PRODUCTION OF CEMENT.—Paul Steenbock, Deutsch Wilmersdorf, Germany. A process of manufacturing a material designed for the production of cement, consisting in mixing a beryllium compound, difficultly soluble in water, and susceptible of being chemically changed by phosphoric acid, with a like compound of a light metal, including zinc.

771,184. PROCESS OF MANUFACTURING VITREOUS CEMENT.—Paul Steenbock, Deutsch Wilmersdorf, Germany. A process of manufacturing vitreous cement, consisting in mixing phosphoric acids with a beryllium compound susceptible of being chemically changed by the same.

771,202. APPARATUS FOR THE TREATMENT OF PEAT FIBER FOR MANUFACTURING HALF-STUFF.—Christian Esser, Vienna, Austria-Hungary, assignor of one-half to Adolph Pollak, Vienna, Austria-Hungary. In an apparatus for the treatment of peat fiber for the manufacture of half-stuff, the combination with the base-plates, the uprights supported thereon, and beaters carried by said uprights, of a table mounted to reciprocate in a fixed horizontal path beneath said beaters, a rack centrally disposed upon the under side of said table longitudinally thereof a shaft mounted transversely of the table in bearings on said base-plates, a gear-wheel on said shaft meshing with said rack, and rollers in pairs mounted in bearings on said base-plates, and disposed upon opposite sides of said rack, and upon which rollers said table is directly supported, a gear-wheel, on the shaft of the first-mentioned gear-wheel, a large gear-wheel meshing therewith, a disk, a crank connected with the shaft of said disk, and a connecting-rod carried by said crank and connected with said large gear-wheel the radius of said crank being less than that of the point of attachment of said connecting-rod upon the large gear.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending September 10, 1904.

17,109 of 1903. SEPARATING SULPHIDES.—A. E. Cattermole, H. L. Sulman and H. K. Picard, London. The use of fatty acids or resin acids for separating sulphides from gangue suspended in water.

20,568 of 1903. MINE TIMBERING.—A. Fernandez, Mexico City, Mexico. A system of mine timbering for levels which leaves a space along the top suitable for assisting in the ventilation of the level.

21,609 of 1903. COATING ALUMINUM.—G. Creswick and H. Shaw, Sheffield. Preparing aluminum articles for gold or silver plating by first depositing a film of tin by immersion in a bath of chloride of tin and ammonium alum.

21,854 of 1903. COPPER-CADMIUM ALLOY.—G. Chaudoir, Vienna, Austria. Adding from 1 to 3.5 per cent of cadmium to copper in order to prevent the copper losing its tensile strength at high temperatures.

23,368 of 1903. GRINDING ROLLS.—W. Simpkin, London. Improvements in the method of holding the adjustable roll of grinding rolls up to its work and keeping the two rolls parallel.

24,148 of 1903. MAKING ALLOYS.—P. & A. Weiller Vienna, Austria. A method of producing alloys or mixtures of oxides by treating a mixture of their salts with iron or other reducing agent.

SPECIAL CORRESPONDENCE

San Francisco. Sept. 21.

The development of California's economic mineral resources is a noteworthy feature of the mineral industry of the State at this period. The total mineral production of $37,759,040 last year represented an increase of nearly $2,700,000, or a little more than the increase represented by the additional 10,000,000 bbl. of petroleum with a reduced valuation. But copper declined over $700,000; gold, about $439,000; borax suddenly dropped from $2,234,994 to $661,400, and silver and a few minor substances decreased slightly. This aggregate decrease was more than made up by the aggregate increase in the aggregate output of substances other than petroleum, which have been of relatively minor importance, but which are now steadily growing in economic value. This result naturally attends and reflects the present rapid industrial and commercial development of the State. Gold will remain king, but an era of marked development of heretofore neglected mineral resources has opened in California. Structural materials, including building stones, terra cotta and pipe, brick, slate, cement, etc., have naturally responded strongly to the stimulus. Portland cement has made and is making the most notable expansion in this industrial group. The industry may be said to be but about two years old, though the old cement plant at Colton, in southern California, now suspended, reached a total of 50,000 to 60,000 bbl. a year. Now the product comes from two new plants, just north of San Francisco bay—the Standard and the Pacific—which have been completely successful from the start. One has a capacity of 2,000 bbl. a day, and the other 1,500 bbl. The latter has trebled its capacity during the current year, and is now doubling its plant, with 3,000 bbl. a day in view by next May. The production of building stones increases at the leading quarries, as it did last year, and new ones are opening. The Columbia marble quarry, in Tuolumne county, is filling contracts for important buildings in San Francisco and elsewhere. The slate output is rapidly increasing. The El Dorado county mine of the Eureka Slate Co. has expanded its output 25 per cent this year, producing about 1,000 squares per month at present. Railroads now building will soon make commercially available widespread mineral deposits that have awaited them.

A recent discovery at the Rawhide mine, in Calaveras county, indicates a lucky escape from disaster. A few days ago the mine was shut down for repairs, in the course of which the floor of the power room was partly torn up. Lying directly under the big electric motor were found two pipes carrying about 50 lb. of dynamite, and with a copper wire running therefrom. The infernal device had evidently been there some time. Last February the union miners at the Rawhide went on a strike, and later Capt. W. A. Nevills put a non-union force at work and installed a force of guards. The responsibility for the placing of the dynamite has not been fixed.

The extensive water supply system of the California Water & Mining Co., together with its mining and other properties in El Dorado county, was sold at Placerville on September 23 under foreclosure proceedings, to satisfy a judgment of $153,702, in favor of the Mutual Trust Co. of New York. Stanley Forbes, the company's manager at San Francisco, was awarded the property for $125,000. Besides the large reservoirs and ditch system, the property comprises considerable mining ground near Georgetown. The future of the property is of interest to the mining industry of the Georgetown Divide, with which it is intimately connected, but further developments are not expected until the expiration of the six months' period for redemption.

The Peyton Chemical Co. has just put into operation at its acid-making plant at Peyton, on the San Francisco bay shore, a small furnace for the treatment of sulphide ores, and a further expansion of the plant is understood to be contemplated. The company is mainly operating on ores from its own copper deposits in the Sierra foothill belt in El Dorado county.

A recent report states that Manvel, the well-known desert mining camp in San Bernardino county, on the Santa Fé branch line to Ivanpah, is to be deserted by its present small population, which will go to Vanderbilt, a few miles north on the same branch line, which is also on the new Overland line between Salt Lake City and Los Angeles. Manvel has heretofore been the railroad terminus of the main stage line to Searchlight, Nev. The early completion of the new Salt Lake road will work many changes to the mining industry on the Mohave desert, in southern California, and through southern Nevada, and immensely stimulate mining development therein.

Most of the large oil producers in the Kern river field have ceased drilling, owing to the great excess of the supply over the demand. The Standard Oil Co. is steadily increasing its tankage in the field. A statistical statement for August shows a production in this field of 1,496,500 bbl. from 668 wells, with 3,045,800 bbl. in storage.

Denver. Oct. 1.

Sheriff Bell of Cripple Creek, has returned from Topeka, Kan., where he had a long interview with Robert Romaine, the self-confessed dynamiter. He declares the confession a fake. In order to escape his punishment on the Topeka charge, and knowing that the Western Federation of Miners would easily prove an alibi for him at the time of his trial, he posted himself thoroughly on the particulars of the Independence explosion and accused himself.

It is probable that the fight against the Western Federation of Miners will be carried into all the mining camps of the State in order to completely destroy the leadership of Moyer and Haywood, against whom it is especially waged. Some of the leading camps in the San Juan district will probably take it up before long, and there is no doubt but that labor agitators will, in the near future, have difficulties to overcome in the Colorado mining districts, which will deter them from creating trouble. This is shown by the following incident, which occurred this week in the Taylor Park district. Four men, said to have been deported from the Cripple Creek district, were ordered out. They were attempting to induce the men at the Woods Gold Mining Co.'s property to try and get an increase of pay, which was refused, and the old employees remained, while the agitators were driven away.

On September 29, the representatives of the New York creditors of the General Metals Co., whose plant is located near Colorado Springs, applied to the United States Court for possession of the works, which are at present in the hands of the federal authorities under an order issued by Judge Hallett, to whom the local creditors, through their attorneys, had applied for relief, previous to the arrival of Receiver Roelker, who had been appointed by Judge Holt of the New York federal court. The Colorado Springs Electric Co., the Curtis Coal Mining Co. and the Rapson Coal Mining Co. filed the original petition to have the General Metals Co. declared bankrupt. The collapse seems to have been caused by its being unable to secure a sufficient quantity of ore in consequence of the large mines having contracts with the United States Reduction and Refining Co., and the strike at Cripple Creek.

The record of the production of the Cripple Creek district for the month of September is excellent. The $2,000,000 mark was passed by a few thousands. More than $250,000 was gained over the month of August, while the tonnage was slightly less, the average value per ton being $28, against $24 during the preceding month. The smelters handled only about one-fifth of the entire production, with an average value of $60 per ton.

The Independent Smelting and Refining Co. is closing contracts and receiving and sampling ores at its Golden plant. The company expects to blow in its furnaces some time this month. A raise of treatment charges of 50c. per ton on the Cripple Creek ores on the part of the smelter and the mill trusts, has been announced.

The office of traffic manager of the Colorado Fuel and Iron Company has been combined with that of vice-president. J. F. Welborn has been appointed to the office.

On October 1 the first passenger train ran to Arrowhead, the present terminal of the Moffat road, and construction work from that point to Hot Sulphur Springs will begin at once; a grading contract, covering about 25 miles, has been let.

The annual report of the president of the Colorado & Southern railroad for the year ending June 30, has been issued. It shows a decrease of $440,000 in gross earnings. The passenger department showed an increase of over $100,000. The falling off of the freight earnings was traced almost entirely to the mines.

Houghton. Oct. 2.

The Franklin mine now has a second shaft in full operation on its Junior property. This shaft was started about a year ago, and by sinking and raising it has been opened to the 9th level. No. 1 shaft, 1,200 ft. north of the new shaft, is opened to the 18th level. The producing portion of this branch of the Franklin mine is opened exclusively on the Allouez conglomerate lode, a formation considerably harder than the Calumet conglomerate. The copper values are not high, but the management states that they are thoroughly disseminated, making the product from all portions of the lode quite uniform, and it is asserted that they can be extracted with profit at the present price of the metal. The margin of profit, however, is so small that the expense of equipping the property and installing additional facilities at the stamp mill have absorbed all the surplus since this portion of the Franklin was acquired. Quite an extensive mine was opened on the Franklin Junior property in the Pewabic amygdaloid lode without favorable results, before operations were begun on the conglomerate. It is officially stated that the ground opened by the new shaft is fully up to the standard which for several years has been produced from No. 1 shaft. A hoisting engine capable of sinking to a depth of over 2,000 ft. is now being removed from one of the abandoned amygdaloid shafts and erected at the new shaft. At the old branch of the Franklin mine a limited amount of good copper rock is being produced. The pillars from the lower workings of the mine which have reached the boundary line are being removed, and contain a high grade of rock. Stopes are also being worked in a lower grade of rock which was passed over in former years as unprofitable. Four stamp heads are in operation at the mill, handling an aggregate of upward of 1,500 tons of rock per day. About one-third of this output comes from the amygdaloidal workings of the old branch and the balance from the conglomerate.

The Quincy mine has just completed extensive repairs to the hoisting engine at No. 7 shaft. This is the most southerly opening of the mine, and the principal source of production. It is opened on a catenary curve approximately following the plane of the lode to a depth of about 5,000 ft. The concrete foundation of the hoisting engine was considerably weakened by settling. This has been thoroughly re-inforced, and it is believed no further difficulty will be encountered. The openings throughout the entire Quincy mine are yielding a very satisfactory output of copper. At the Mesnard branch, which is opened by No. 8 shaft, and which lies north of the old Franklin, the results are particularly satisfactory. This property was acquired a few years ago for the purpose of connecting with the lower workings which may be reached below the Franklin boundary, and it was not known that profitable ground would be penetrated while sinking the shafts. In several of the levels, however, high-grade copper rock is being opened up, and the Mesnard promises to become an important source of production for the Quincy.

At the Centennial mine only No. 1 shaft is yet in operation. No. 2 shaft is opened through to the 18th level and a raise upward from the 25th level has attained a height of over 400 ft. The rock shipments amount to approximately 600 tons a day, which is being treated with one head in the mill. The results are very satisfactory, according to the management, but no figures are given out.

The Calumet & Hecla has completed its permanent shaft at No. 19 location on the Kearsarge lode from the surface to a depth of 150

ft. Through 60 ft. of quicksand the shaft is built of solid concrete on all sides, with a triple arched hanging wall, composed of three and four courses of brick encased in concrete. A shaft house is being erected and a hoist good for 3,000 ft. is installed. The copper ground opened in this shaft, although still meager in area, shows a highly encouraging character, being up to the Kearsarge standard. At No. 20 location, lying 1,500 ft. south of No. 19, a pit through 40 ft. of overburden is now being bottomed on the rock, and a concrete shaft, similar to No. 19, will be built there. In the exploratory shaft, from which drifts are being extended, at No. 20, the former lack of mineralization is giving way to a betterment. At No. 21 location, lying about a mile south of No. 20, a cross cut is being driven at a depth of 100 ft. from the bottom of the exploratory shaft, for the purpose of opening the Kearsarge lode.

ARTHUR L. CARNAHAN.

Duluth. Oct. 2.

One of the diamond drills working for the past 18 months on the famous Section 30, Vermilion district, has stopped, and the two remaining are understood, unofficially, to be in their last holes, providing they do not find encouraging indications of ore. This is possibly the close of this remarkable exploration for the present. It has been under way for a year and a half, and about $100,000 has been spent, in addition to the more than $1,000,000 the land cost in litigation in the past 20 years. This tract has been in dispute since 1882, and only got into the proper hands in January, 1902. It was then taken under option by parties, who, in five months, became satisfied the there was no bonanza in it and dropped the work. This was taken up by others, who have continued until now, and are still at work. The cessation of operations will not disprove the tract, for it is a big piece of land, and the formation is wide and large, but it will go a long ways toward discouraging prospecting companies, on the Vermilion range, and may set back that district many years. This on account of the peculiar conditions on Section 30 and the wonderful surface showings there. Though the Vermilion extends for 50 miles and more, a strong, rich, persistent, possible ore-bearing formation, no deposits of ore in merchantable quantity or quality have been found except at Tower and Ely, two points 21 miles apart. As high as $300,000 to $400,000 have been spent in single years in exploration, and it is stated that more money has been put into the ground between Tower and Ely in single seasons than has been spent in all the Canadian ranges north of Lake Superior, Michipicoten alone excepted, in their entire career. To date, Section 30 represents an investment of more than $1,100,000.

Pickands, Mather & Co. have bought, subject to verification of records underground, a 40-acre tract in Section 6—58—15, which has been shown to contain about 900,000 tons of excellent ore. This tract was offered to the United States Steel Corporation, but declined. It will be an underground mine and quite wet. The ore is a very desirable coarse bessemer. Explorations near by, on land belonging to R. H. Palmer and associates, have shown a body of ore running north and south about 1,000 ft. and of good grade, which is to be opened the coming winter by the discoverer as an underground mine.

There is some inquiry for properties in the Lake region by intending purchasers, and conditions among explorers are much better than for some time. Few sales have taken place, but the tone is improved materially.

Stocked ore that has been on surface for months, some of it for years, is being moved forward at a rapid pace, and it is evidently the intention that the upper lake mines shall have as little ore for carrying over winter as may be. This is of the utmost importance to miners, as it indicates far better work during the winter than if there were great stocks of unshipped ore about the mines. Large stock piles act as a deterrent of heavy operations, for mining companies do not want to lift large tonnage when they already have vast quantities unshipped. On all ranges this shipment of ore is now at high rate, and the movement for September was nearly 1,000,000 tons greater than for the same month last year, reducing the shortage this season to about 5,000,000 tons. It is probable that the amount of ore to be shipped for the full season will exceed recent estimates and be fully 20,000,000 gross tons, a decrease from last year of not more than 4,500,000 tons.

The Duluth & Iron Range railroad is to rebuild its No. 3 ore dock at a cost of about $50,000, and if arrangements can be made to extend the dock to about double its size, the cost will be $250,000. This is the oldest and smallest of the road's shipping docks, and is too low to accommodate the newest and larger vessels of the lake fleet. It will be raised to 62 ft. total height. Other lake roads are preparing for additions to motive power and equipment, a sure sign that they look for a bigger business in 1905 than they have had this year. The Duluth, Mesabi & Northern is selling off all its wooden cars, and will replace them all with steel cars of 112,000 lb. capacity.

Jordan mine, of Corigan, McKinney & Co., has closed for the season with an output of 180,000 tons. The Antoine Ore Co., of the Republic Iron & Steel Co., has closed with 80,000 tons of a product. They are both open pit mines, one on the Mesabi and the other on the Menominee range.

Salt Lake City. Sept 30.

A party of shareholders and investors visited the Bingham Copper Bay property at Bingham on September 26.

C. O. Newell of Provo, associated with other citizens of that town, has organized a prospecting company, and during the coming year will send several men into Nevada to prospect new districts for properties of merit.

George Georgetta, formerly superintendent of the Queen of Sheba mine in the Deep Creek mining district, has secured a working bond on the Midas mine and mill near Fish Springs, Utah.

The Uncle Sam Consolidated has purchased a good second-hand hoisting plant from the Carisa Mining Co., of Tintic, and is having it moved over to its property to replace the plant destroyed by fire a week ago. The plant will be in operation within a month.

The Continental-Alta Mining Co., Henry M. Crowthers, of Salt Lake, manager, is to be equipped with an aerial tramway, and contracts for the equipment will soon be let. It is the intention to erect the tram this fall. The line will be utilized in the transportation of ore from the mine to the mill, which is now being constructed. The mill will be under cover within a week.

Dr. U. V. Withee, of Ogden, has purchased the Mammoth group of claims at Mountain City, Nev., paying $11,000 therefor, and, with Boston men, has organized a new company.

A director of the United States Mining Co. is authority for the statement that at least three months will elapse before another dividend will be paid. Until the construction period is over, the statement is made, stockholders need expect no more than $1 per share in dividends annually.

That a reverberatory furnace will be added to the equipment of the Yampa smelter at Bingham is almost certain. Walter S. Kelley, of Salt Lake, is general manager.

Albert Singleton, of Provo, and other citizens of that place, have acquired a valuable group of asphaltum claims near Soldier Summit, and preparations are being made to forward shipments to local markets.

The contract between the Ontario and Daly-West mining companies, which calls for the extension of the Ontario drain tunnel to the Daly-West side lines, has been ratified by all parties concerned. The contract stipulates that the Daly-West company is to pay to the Ontario and Daly companies, the joint owners of the tunnel, an annual rental of $9,000, or $750 per month. The tunnel is to be run to the territory of the Daly-West company by the present owners of the tunnel, they to bear the entire expense. This much done, the Daly-West company is then to take up the work and continue the adit through its own ground. The distance from the face of the tunnel to the Daly-West side lines is about 800 ft. The work is to be undertaken at once. The original cost of the Ontario drain tunnel was about $1,000,000. The adit will cut under the collar of the Daly-West shaft at a depth of about 2,100 ft. The Daly-West retains the right to mine through the tunnel, if it choses to do so, in the future.

Bisbee. Sept. 30.

G. H. Crosby, of Duluth, Minn., has been here the past few weeks, and has taken an option for himself and associates on a number of claims lying east of Sacramento hill and on the opposite side of the great fault from all mines in the camp. Nobody has ever supposed, and most do not think now, that there has been ore concentration this side the dividend fault. Mr. Crosby says that he will explore there with drills the coming winter. In the Paradise district his Sullivan claim is showing some carbonates that look well and the owners are very much encouraged.

Bonds on the Michizona, amounting to $100,000, will be paid and the property taken before January 1. There is considerable ore in sight from the development of the past three months, and the property looks like a mine, when sufficiently opened. This property is in what is called the Turquoise district, and much activity has sprung up there since the Michizona company took the Leadville group. Another large group is now on the market, and attempts are being made to place it in Minnesota and Michigan for $165,000.

Copper Glance has practically given up the ghost, has quit work, pulled its drills, paid off its men, and is through. It has a few hundred dollars on hand, and may sell new stock and become active later if conditions seem favorable. In a recent article in the JOURNAL, 'Notes on the Bisbee District,' this property was referred to as one of those likely to be through soon.

Another of the prospects spoken of unfavorably in the same article was Higgins. At the rate drifting has been under way in Higgins for the last two weeks the drift on about September 20 should have cut an orebody that had been found in a winze. Reports do not indicate that it has come in yet. That this pocket of ore would go down is generally considered here as Higgins's main hope, and if it is not cut soon the property may be dropped for the present.

Still another was Mitchell Development. There have been stockholders' meetings recently at Ishpeming, Mich., to decide on the future, and though results have not been announced here, it is supposed the company is through. Its options expire in a few months, and there is scarcely any hope that ore may be found before then.

These late developments, together with the Calumet & Cochise, Marquette & Arizona, and others that have quit within the past few weeks, have put a decided damper on land speculation through the Warren district.

Toronto. Sept. 29.

W. E. H. Carter, Provincial Inspector of Mines, reports that the steel plant at Sault Ste. Marie is working day and night, with about 600 men employed; the output averages 500 tons of 80-lb. rails per day. The blast furnace is receiving the finishing touches, and it is proposed to begin smelting by the end of October. In the meantime supplies of iron ore and coke sufficient to last during the winter are being laid up. About one-third of the ore used will be from the Helen mine, and the remainder from Michigan and Minnesota. The Helen mine is in good condition and is being worked systematically and economically. The output averages about 1,000 tons daily of a grade containing 60 per cent iron and low in phosphorus and sulphur. After this fall all mining will be done underground. The ore is being shipped as fast as mined, mainly on old contracts, to American ports. A copper smelter and dynamite factory are also possibilities at the Sault.

The Shakespeare gold mine, near Webbwood, has been reopened and a stamp mill has been purchased and is on the way.

Mr. Carter also reports from the corundum district of Hastings and Renfrew counties that the Canada and Ontario corundum companies are both actively at work. The latter is erect-

ing a new concentrating plant capable of handling about 75 tons per day. The process will be entirely dry. Corundum Refiners, Ltd., has a small force putting up camp buildings and making preparations to erect a mill and begin mining next season.

Cornelius Shields, managing director of the Sault Ste. Marie industries, arrived in Toronto on September 26. He expressed himself especially gratified with the results of the tests to which the steel rails are subjected. Four rails are made from an ingot of steel, and one of each four is tested on a 1-ton weight dropping 20 ft. Within two weeks only one rail has been broken. He stated that the two furnaces, when put in operation, would turn out 400 tons of pig iron per day, which would be within 100 tons of the quantity required for the daily run of the steel plant.

A number of British and Canadian capitalists met at Windsor, Ont., on September 27 and organized a company to prospect for oil and gas in the Leamington district. They have applied for a charter as the Beaver Oil and Gas Co. of Leamington, with a capital of $250,000. John J. Foster and Dr. Reaume, of Windsor, are on the board of provisional directors.

The plant of the Cramp Steel Co., of Collingwood, was formally handed over to its successor, the Northern Iron & Steel Co., Ltd., on September 28. President Currie states that active operations will be begun in November. Dr. Stevenson, of Vanderbilt University, Nashville, Tenn., will be appointed one of the directors as a representative of the interests of American shareholders.

The Imperial Steel & Wire Co., of Collingwood, has extensive orders for its output on hand, including orders for 12,500 rd. of wire fencing.

A large party of the members of the British Institute of Civil Engineers arrived here from the East on Sunday. On Monday they were given a formal reception at the City Hall, where they were welcomed by Mayor Urquhart, and at the parliament buildings were received by Premier Ross. In the evening they were entertained by the Engineers' Club of Toronto.

Victoria. Sept. 27.

Atlin.—A promising discovery of quartz has been discovered at the head waters of Boulder creek. The ore carries satisfactory values in both gold and silver, and the surface showing indicates an orebody approximately 70 ft. wide. Exploration work is now in progress. In the Alsek district coal has been discovered on both Kimberley and Sheep creeks, the seam at the latter point being 15 ft. wide.

Kamloops and Cariboo —A small seam of bituminous coal was encountered this week at a depth of 260 ft. at the property of the Kamloops Coal Development Co., on Coal Hill. An effort is being made to thoroughly exploit the coal measures in this vicinity. The Highland Valley mines, near Ashcroft, were recently examined by Mr. Yolen Williams and Dr. Sussman, of New York. A second clean-up has been made at the Cariboo Hydraulic mine, Bullion, the value of which is estimated at $30,000. The dredge on the Fraser at Lilloett is in steady operation, the daily gold recovery averaging between six and seven hundred dollars.

Lardeau.—It has been decided to continue operations at the Triune mine throughout the winter, instead of, as formerly, suspending operations during this season of the year. The mine is now shipping a considerable quantity of high-grade ore to Trail.

Slocan.—There is a likelihood of a resumption of operations at the Noble Five, a mine which at one time paid handsomely. With this end in view the property was recently examined by W. J. Sutton, of Victoria, geologist retained by James Dunsmuir to look after his mineral interests. Several carloads of zinc ore have been shipped recently to the Kaslo sampler from the Lucky Jack mine.

Nelson.—The Mollie Gibson mine is now in steady operation, C. E. Trethewey having recently been appointed superintendent. An additional 500 ft. of tramway has been installed and other preparations made for the early commencement of shipments.

Exploration work has been commenced at the Crawford Bay iron mines with the driving of a tunnel, which is designed to encounter the ore at a depth of 1,000 feet.

Rossland.—The Le Roi No. 2 Co. has bonded four claims on Red mountain, known as the Evening-Eureka group, the development of which has already begun.

At the annual meeting of the Denoro Mines, Ltd., the president stated that 28,000 tons has been shipped during the year, and besides liquidating a liability of $28,000 the company had purchased a 7-drill compressor and other plant, done much development work and had a substantial cash balance in hand.

Boundary.—A number of important transactions have recently taken place in this district. These include the bonding of the Lancashire Lass, in Summit camp, and the Sudbury, in Deadwood camp, by the Montreal & Boston Co.; the bonding of the E. P. U. group, near Greenwood, by a Dakota syndicate; and the bonding of the Strathmore, near Greenwood, by a Rossland syndicate. The Providence mine has declared another dividend of 10c. per share. The Montreal & Boston Co. is preparing to begin regular shipments, probably at the end of this month. At the Stemwinder a new gallows frame is being erected, while stripping work is in progress at the Rawhide.

East Kootenay —It is proposed to form a company at Fort Steele to dredge a section of Wild Horse creek, where tailings were deposited from former placer mining operations. In the early '60's Wild Horse creek, mined by the crudest methods, yielded $20,000,000. It is supposed that a large percentage of gold was lost in the tailings, hence the present project. It is reported from Spokane that in connection with the Sullivan company's smelter a plant for the manufacture of pipe and white lead is to be installed. There are still, it is said, large bodies of low-grade ore at the North Star mine. Samples of this ore have been sent to Trail smelter to ascertain whether it may be profitably shipped. Should this be found to be the case, the mine is capable of supplying a considerable tonnage.

The Western Oil & Coal Co., of Vancouver, has struck oil in paying quantities in southern Alberta, near the South Kootenay pass of the Rocky Mountains. The company has dug in all three wells. The first showing of oil in the well was from a depth of between 120 to 130 ft., the second from 440 to 448 ft., the third from 1,043 to 1,073 ft., and the fourth at 1,300 ft. The well is 1,496 ft. in depth and has been plugged pending operations on the other wells, where strata of oil have already been struck. The average flow of the well was 13 bbl. a day.

Monterey. Sept. 28.

The camp of Cusihuiriachic, in the State of Chihuahua, has been practically washed away by floods, and communications with the railroad have been almost completely cut off. But in spite of heavy rains throughout the northern part of the Republic, work is being pushed in every direction. The Terrenantes Consolidated, now known as the United States Mining Co., has started its railroad from Villa Escobeda to the mines, near Parral. At the Santa Ramona, about 65 miles from Mesa de Sandia, the end of the Parral & Durango railroad, a 5-stamp mill is being erected by D. J. Knott, and plans are being prepared for a cyanide plant in connection with this. The Parral Milling Co. is increasing its capacity from 70 to 100 tons per day, under the management of A. H. Lubeck, of Parral. The Central mine at Almoloya, between Jimenez and Parral, has been sold to N. O. Bagge, of Los Angeles, Cal., for $100,000 gold, and work will be started at once under the charge of D. W. Shanks. It is reported that the Quebradillas and other properties of the Pan-American Mining & Smelting Co., one of Dr. R. C. Flower's defunct companies, now held under option from James I. Townsend by Grant G. Gillett, has been turned over by the latter to a company of Ohio, Pennsylvania and New York people, and that a company with $3,000,000 gold capital is being organized to buy up and work the properties on a large scale. They are already producing 35 to 40 tons of fine ore daily.

In Jalisco Mr. Ferdinand Sustersic has been appointed general manager of the Amparo Mining Co., of Philadelphia, operating the Santo Domingo, near Etzatlan, to take the places of Messrs. J. R. Williams and C. G. Graham, former general manager and superintendent, respectively, who resigned from the mining department to take charge of the erection of the Pohle-Crossdale volatilization process reduction plant, which the company is building at Ahualulco. The Bolaños Mining Co., of St. Louis, with $5,000,000 gold capital, of which W. C. Stith is president, is preparing for the erection of a 150-ton mill at the company's mines at Bolaños, in the northern part of the State, and work will soon be started nuder the management of J. B. Izabal. The Tula Iron Works have been taken under a 10-years' working lease and $700,000 gold bond by R. H. Beach, of the General Electric Co., and George Townsend, of Indianapolis, and associates; a railroad will be built from the Zapotlan branch of the Mexican Central, and other improvements will be made under the general management of J. E. Jones, formerly with the Phœnix Rolling Mills, of Pittsburg.

There is no longer any question about the erection at Velardeña, in the State of Durango, by the Guggenheim Exploration Co., or the American Smelting & Refining Co., which are closely allied, of an immense smelting plant of about 1,000 tons' daily capacity. The plans have been drawn and accepted, and the actual work of construction is practically begun. This is the property for which the Guggenheim Exploration Co. paid $6,000,000 gold for a three-fifths interest this spring. The old plant was closed down pending the arrangements which have now come to a head. Work will be pushed with all possible speed. All told, the improvements, railroads, etc., will amount to over $1,000,000 gold. Messrs. Matt Dahlgren and Chas. Wilhelm, former manager and superintendent of the old Velardeña Mining & Smelting Co., which name has been maintained by the Guggenheims, have made some rich strikes of 8% copper on property adjoining the Velardeña.

London. Sept. 24.

For some weeks it has been known that the British South Africa Co. contemplated the issue of new capital, and this week the official notice has been issued to shareholders that the directors propose to create 1,000,000 new shares and offer them at 21s. each. This is the lowest price at which the company's shares have ever been issued, and compares with £1 13s. 9d., the price obtained for 400,000 shares in February last. Altogether, the nominal capital is now £5,000,000, and the actual cash subscribed works out at about £12,000,000 sterling. In 1895 shares were issued at £3 10s. each, at which time the stock of the company was booming. The present policy of issuing them at 21s. is open to some criticism, seeing that the market price is nearer 30s. If the new issue were offered solely to present shareholders there would be some logic in the arrangement. As a matter of fact, however, half the issue is underwritten, so that the fortunate underwriters are being presented with a very handsome bonus. It is noteworthy, in connection with the shares of the company, that they have never been publicly advertised. Successive issues are always absorbed by the shareholders. There are over 40,000 shareholders, and many of them have large stakes in the industries of South Africa. It was anticipated a year ago that the company's income and revenue would before long become level, and that the issue of February last would be the final one. Since then it has been found advisable to continue expenditure on a liberal scale. The time when the capital of the company can be converted into a guaranteed debt of the State of Rhodesia is still far off. The residents in Rhodesia are continually being sounded on the subject. As yet neither the agriculture nor the mining of the province has been established on any safe basis, and the income of the company consists to some extent of the realization of assets rather than

trading profits or revenue. It is doubtful whether the inhabitants of Rhodesia could stand at present any additional taxation to provide the interest on the company's capital. The question of the arrangement of the public debt of the Transvaal will also have to be settled before the government, or finance houses, would care to tackle that of the Rhodesian debt.

Sydney. Sept. 6.

The figures furnished in the recent issue of the 'Australian Joint Stock Company's Year Book' emphasize the fact that the mining industry in Australasia is not in such a satisfactory position as in preceding years. It is shown that during the past year there was a falling off in the capital invested in mining companies of £12,300,000. This not only illustrates the amount of capital which has been unprofitably sunk, but also indicates that fresh capital has not been forthcoming for new ventures. The total capital invested in Australasian mines is given as £77,660,000, of which sum £50,470,000 were provided from abroad and £27,190,000 locally.

The gold yield for the State of New South Wales for the first eight months of this year is 178,644 oz. fine, valued at £758,832, and shows an increase of 26,307 oz, and £111,745 in value, over the corresponding period last year. The largest output is contributed by the mines at Cobar; the mines at Wyalong are also developing well, and all the mills are kept going on average grade ore, while large parcels of rich sulphides are being despatched to the Customs Smelting Works. The Baker's Creek mine has been one of the most constant producers in the State, but the reef has now pitched out of the company's property, and all development work has consequently been abandoned. The output from the Gympie goldfield is the second largest in the State of Queensland, but it is known that the reefs now being worked in the Monkland slates at the southern end of the field are bounded by the Phœnix fault, and that, in the absence of any fresh disclosures, the field must at no distant date forfeit its position. There is, however, every possibility that the third bed of slates will be proved to contain rich reefs, as good gold was obtained in these slates in the shallower ground. The companies interested are accordingly being urged to combine for the purpose of systematically prospecting this formation by means of the diamond drill.

Consequent on the continued slackness in the coal trade, the Northern Colliery Proprietors' Association has decided to reduce the declared selling price of coal from 10s. to 9s. a ton. This decision carries a proportional reduction in the hewing rate from 3s. 10d. to 3s. 6d. a ton, but only the collieries in the Newcastle district are affected. The coal seam in this district cannot be worked as cheaply as the other seams in adjacent districts, whilst the opening up of a number of new collieries has had the effect of spreading the diminished trade among a greater number of owners. The present position was thus forced upon the owners in the Newcastle district in order to compete successfully for a share of the trade. The miners naturally view the reduction with much disfavor, and are busy talking strike.

The Crowl Creek copper mine, at Shuttleton (N. S. W.), is developing very satisfactorily, and is at present maintaining an output of 20 tons of copper per week. The published report of the Mungana Mining Co., Chillagoe, although showing a profit of £4,267 on the operations for the year ended June 30, bears unfavorable comparison with that of the previous period. The output of metals by the company during the year 1903-4 was: Copper, 353 tons; lead, 1,904 tons, and silver, 167,496 ounces.

Sensational finds of opal still continue to be reported from the White Cliffs field. A party of three men, who camped temporarily in the field, recently obtained opal to the value of several thousand pounds at a depth of between 9 in. and 4 ft. from the surface. As the result of several other righly remunerative discoveries a rush has set in. An improvement is also shown in the local market for opal, and the indications point to a substantial advance in prices.

PERSONAL.

Mining and metallurgical engineers are invited to keep The Engineering and Mining Journal informed of their movements and appointments.

Mr. S. F. Emmons has returned to Washington.

Mr. George S. Tremain, of Jalisco, Mex., is in Chicago.

Mr. James R. Cahoon has returned to New York from Mexico.

Mr. Chas. Andrews is examining properties in Guerrero, Mexico.

Mr. Geo. A. Schroter has returned to New York from the Caucasus.

Capt. Anthony F. Lucas returned from Europe on the *Rotterdam*.

Mr. H. H. Knox has returned to New York from the Ural region, Russia.

Mr. Daniel Guggenheim reached New York by the *Baltic* on September 29.

Mr. Philip L. Foster has returned to New York from Telluride, Colorado.

Mr. Frederick J. Pope, of Ricketts & Banks, has returned from Cape York, Alaska.

Mr. T. S. Reilly, of Mexico City, has gone to Chile to erect a smelting plant.

Mr. Leon Dominian is at Washington, D. C., where he will remain several weeks.

Mr. S. B. Simpson, of Nevada, Mo., is examining some mines in Oaxaca, Mexico.

Mr. Harry H. Webb sailed by the *Kaiser Wilhelm II.* for London on October 4.

Mr. H. Banfield is manager of the Rainbow mine, at Drew, in Douglas county, Oregon.

Mr. W. L. Austin is consulting engineer to the White Knob Copper Co., at Mackay, Idaho.

Mr. T. P. Rigney will re-open an office as consulting engineer at Salt Lake City, Utah.

Mr. G. T. Malalley is in Chicago organizing a company to operate mines in Durango, Mexico.

Mr. James T. Fulton, Salt Lake City, has been investigating some mining properties in Mexico.

Mr. T. E. Schwarz has returned to Denver from New Mexico and is now at the St. Louis Exposition.

Mr. Felix de Raczkowski, of Freiberg, is visiting New York, preparatory to a journey to the West.

Mr. F. Milton Johnson, who returned from Brazil recently, will proceed to Mexico early in October.

Mr. N. H. Clark has been appointed general manager of the White Knob Copper Co., at Mackay, Idaho.

Mr. Henry Hudson Smith, of Philadelphia, has resigned his official connection with Madeira, Hill & Co.

Mr. W. G. Barney, of Silverbell and Tucson, Ariz., is making a short visit in New York city and Buffalo.

Mr. E. G. Spilsbury has severed his professional relations with the Virginia-Carolina Chemical Company.

Mr. Frank J. Hearne, president of the Colorado Fuel & Iron Co., has been recently in the East on business.

Mr. Robert M. Raymond, manager of El Oro mine, Mexico, has been to St. Louis and is now in New York.

Mr. Percy L. Fearn has severed his connection with the White Knob Copper Co., and is now in New York.

Mr. Reeves Davis has been examining mining properties on the lower Klamath, Siskiyou county, California.

Mr. L. G. Parks is at St. Louis, Mo., in the interest of the Peñoles Mining & Development Co., of Oaxaca, Mexico.

Mr. H. B. Vercoe, of Fresno, Cal., owner of the Fresno copper mine, is on his way home from a visit to London.

Mr. Martin Becker, of Berlin, Germany, is in the West on his way to Australia, where he has large mining interests.

Mr. F. E. Young is investigating mining properties for New York and Boston investors in Siskiyou county, California.

Mr. I. Wayne Von Leer, of New York, has gone to Mexico to examine the property of El Carmen Copper Company.

Mr. R. W. Rodda, of Seattle, Wash., returned recently from a professional trip to Texada island, British Columbia.

Mr. R. Hathorn Greaves has left London for Upper Egypt, to act as manager for the North Nile Valley Mining Company.

Mr. E. E. Abercrombie, director of the Boston Consolidated Mining Co., has been inspecting the property in Utah.

Mr. A. E. S. Laughton, manager of the Zavaleta mines, in Oaxaca, Mexico, has been taking a holiday in New Hampshire.

Mr. Percy Williams, who has been making an examination of the Atlas mines, near Red Rock, Ariz., has returned to New York.

Mr. F. J. Hubbard, a London mining engineer, is making examinations in the State of Jalisco, Mexico, for an English company.

Mr. L. W. Trumbull, of the University of Wyoming, is making an examination of placer property in the Medicine Bow mountains.

Mr. G. Schumacher, of New York, president of the Central Foundry Co., of Alabama, has been looking after interests in that section.

Mr. Spencer Miller, chief engineer of the Lidgerwood Manufacturing Co., of New York, has returned from a business trip to Russia.

Mr. Henry Woodhead, of William Johnson Sons & Co., Leeds, England, is expert to the United States Fuel-Testing Plant at St. Louis.

Mr. H. G. Grannis is in New York on business connected with the Cerro Azal copper property of the Magdalena district, in Sonora, Mexico.

Messrs. Winkhaus and Luthgen, mining engineers in the employ of the German government, are visiting the Lake Superior mining region.

Mr. W. Nance Williams has been appointed manager of the North Sheba Gold & Exploration Co., Ltd., and is now on his way to South Africa.

Mr. Charles E. Rowe, who has recently opened an office at 420 McPhee building, Denver, Colo., is now in Leadville examining mines.

Mr. H. W. Ogilbe, of San Francisco, has returned from the examination of tin deposits near Nome and in the adjacent districts of Alaska.

Mr. C. W. Whitley, manager of the Salt Lake plants of the American Smelting & Refining Co., has returned to Salt Lake from New York.

Mr. Charles A. Parker has resigned as traffic manager of the Colorado Fuel & Iron Co. to become second vice-president of the Cincinnati, Hamilton & Dayton railroad system.

Mr. J. C. Ralston, of Spokane, Wash., who has been engaged at Tonopah, Nev., for the past year, has gone to Eureka, Cal., to engage in the preliminary work of a railroad enterprise.

Mr. C. L. Dignowity has returned to New York, after an extended trip through the mining regions of the West and Southwest, and of Mexico. He will remain in New York through the winter.

Mr. Walter Fitch has been appointed general manager of the mines and smelters of the United States Mining Co., of Utah. Mr. Fitch has for over 20 years been manager of the Champion mine in Michigan.

Mr. J. H. McQueen, second vice-president of the Sloss-Sheffield Steel & Iron Co., and Mr. Fred. K. Dimmick, president of the Dimmick Pipe Co., of Birmingham, Ala., recently made a trip to St. Louis, Chicago, Cincinnati and other points in the West.

Sir William Ramsay, former president of the Society of Chemical Industry, and Mr. William H. Nicholls, the present president, have received the honorary degree of Doctor of Science from Columbia University. The first award of the Barnard Medal was also made to Sir William Ramsay and to Lord Rayleigh in recognition of their discovery and investigation of the new element, argon.

OBITUARY.

Gwilym M. Williams, who died of a complication of diseases at his home in Wilkes-Barre, Pa., on October 4, was born in Ystradgynlais, South Wales, in 1841, came to this country in 1859, and settled at Coleraine, Carbon county, Pa. In 1861 he went to Scranton, and in 1873 was appointed inside foreman of the Oxford colliery. In 1880 he was appointed mine inspector of the old fourth anthracite district, and moved to Wilkes-Barre. This position he held for 21 years, making an enviable record for courtesy, firmness and efficiency. He resigned in 1900 to become superintendent of the Kingston Coal Co. Mr. Williams was noted for his courage, integrity and kindly disposition, and was a public spirited citizen. He leaves a widow and a daughter.

SOCIETIES AND TECHNICAL SCHOOLS.

American Society of Civil Engineers.—The 36th annual convention of this society was held on October 3, in the Hall of Congresses, Louisiana Purchase Exposition, St. Louis, Mo. At this meeting the president delivered the annual address. Many members of the International Engineering Congress and foreign engineers were present during the delivery of the president's address.

Columbus School of Mines.—A building, to cost approximately $85,000, is to be constructed for this school, at Columbus, Ohio.

Lehigh University.—The following appointments have been made: Winter L. Wilson, assistant professor in civil engineering; Sherman M. Turrill and Robert W. Gay, instructors in civil engineering; Arthur W. Klein and Evert O. Eastwood, instructors in civil engineering. Other new instructors are Charles W. Brown, in the department of geology; Stanley S. Seyfert, electrical engineering, and George C. Beck, chemistry.

TRADE CATALOGUES.

In catalogue No. 39 the Newton Machine Tool Works, Inc., of Philadelphia, describes its cold saw cutting-off machines. The book is provided with excellent illustrations.

The Northern Electrical Manufacturing Co., of Madison, Wis., has prepared an interesting and valuable little book describing its exhibit at the St. Louis Exposition. A useful map of the Fair grounds is included.

Meyer-gear pumping engines for small water-works and elevator service are described in bulletin L-601, published by the Laidlaw-Dunn-Gordon Co., of New York City. These engines are built in the cross-compound and 3-cylinder compound types and with fork frames of rolling-mill frames, and their cost is said to be moderate, while their steam consumption is hardly more than half of that of the best types of direct-acting compound pumps.

Some tests of a Reeves simple engine, made recently in the engineering laboratory of Cornell University, gave some interesting results. The engine cylinder is 15 in. diameter by 14 in. stroke; the vale is of the piston type, with adjustments whereby the valve ends may be adjusted to stop leakage through wear. The cylinder and valve chest are well lagged. The main bearings are large, and all rubbing surfaces are lubricated from a central oiling system. In testing, there was no trouble from heating or otherwise, under any load the engine was able to carry. For the test the engine was furnished with two fly-wheels, one entering an automatic governor of the Rites type, the other being for the application of a pony brake. Two sets of runs were made, one non-condensing, the other condensing with the highest vacuum attainable, about 23.5 in.; the load varied from friction load to about 25 per cent overload; the runs were from one to two hours. The results of these tests are presented in three sheets of curves published in a little pamphlet recently sent out by the Reeves Engine Co., of New York City. The highest mechanical efficiency reached, non-condensing, was 92.5 per cent at 147.1 developed, and condensing, 95.8 per cent at 154.1 developed h.p.

INDUSTRIAL.

The Lidgerwood Manufacturing Co., of New York, has installed 10 Lidgerwood marine cableways on the 10 largest battleships and cruisers of the Russian Baltic fleet.

The contract for the new structural mill, to be built by the Republic Iron & Steel Co. at the Brown-Bonnell plant at Youngstown, O., has, it is reported, been let to the Lloyd-Booth department of the United Engineering & Foundry Co.

It is reported that the Inguaran copper property, located in the State of Michoacan, Mexico, is to be developed on a very extensive scale by the French Rothschilds. M. Robellar, a French mining expert, is to have charge of the development.

One of the features of the B. F. Sturtevant Co.'s new office building at Hyde Park, Mass., is the lunch room, located in the basement of the building. Arrangements were first made with a caterer to furnish lunches, but the desire for home lunches became so prevalent that the company now hires the help and furnishes lunches at cost.

T. M. Kirkwood, of Toronto, Can., has purchased from Wickes Brothers, New York, a large rolling mill equipment, consisting of roll-trains, boilers, engines and other machinery. Mr. Kirkwood is building a plant at Winnipeg, Manitoba, which, when completed, will be a modern rolling mill for the production of merchant bar iron, etc.

The Lorain Steel Co., of Philadelphia, will erect an addition to its plant in Johnstown, Pa., to cost from $85,000 to $100,000. The new building, which will be occupied by the shear, hammer and bolt departments, will consist of two bays, with a total frontage of 165 ft. and a depth of 250 ft. The contract for the steel structure, erected, has been awarded to the American Bridge Co. It is expected that the building will be completed about February 1. There will be no addition to the present power plant.

A central compressed-air power transmission plant has been installed at the North Amherst, O., quarry of the Cleveland Stone Co. by the Ingersoll-Sergeant Drill Co. A saving, amounting to approximately $50,000 a year, is reported. The air lines have been extended to two smaller quarries in the neighborhood, where the air is used to operate a 125-h.p. Brown Corliss engine driving a six-gang sawmill, two large pumps and several smaller ones, five channeling machines, five rock drills, four hoisting stations and several blacksmith fires.

Messrs. Adam Cook's Sons, New York, the makers of Albany grease, are in receipt of a letter from C. F. Miller, superintendent of the ice department of the Sparta Gas & Electric Co., Sparta, Ill., in which he states that the company has tested this lubricant and finds it entirely satisfactory. Mr. Miller adds: "We would like very much if we could use cups on all of our bearings, as the Albany grease lasts so long and saves much trouble in oiling." Messrs. Adam Cook's Sons will send a sample of Albany grease and an Albany cup free of charge to engineers for testing.

The Frue Vanning Machine Co., of San Francisco, reports the following sales since July 1, 1904: Sixteen 6-ft. Frue vanners to the Kennedy mine, Jackson, Cal., completing an equipment of 40 of this style of machines for the new 100-stamp mill; eight 6-ft. Frue vanners to the South Eureka mine, Sutter Creek, Cal.; four 6-ft. Frue vanners to the Central Eureka mine, Sutter Creek, Cal.; two 6-ft. Frue vanners to the Keystone mine, Amador City, Cal.; four 4-ft. Frue vanners to the Hurrah Quartz mine, Nome, Alaska; three 4-ft. Frue vanners to the Gold Dike Mining & Milling Co., Summerville, Siskiyou county, Cal.; one 4-ft. Frue vanner to Chas. Richter, Fresno, Cal. All of these machines were furnished with the Brownell patent lip flange belts. In addition to the above sales of Frue vanners, the company has shipped twenty-nine 6-ft. and thirty-two 4-ft. Brownell patent lip flange belts for supplies, shipments being made to Chinnampo, Korea; Douglas Island, Alaska; Eagle-Shawmut mine, Chinese, Cal.; Oneida mine, Jackson, and numerous other well-known mines on the Pacific Coast.

GENERAL MINING NEWS.

The Greater New York Home Oil Co., organized several years ago, with an authorized capital of $2,000,000, its shares being of the par value of $1 each, was sold October 3 under foreclosure by Chauncey G. Parker, the receiver, for $200. The purchasers were Henry Diers and William Poplebaum, of Brooklyn, N. Y., who bought the right, title and interest of the corporation to mining and oil rights in California and Texas.

ARIZONA.

PIMA COUNTY.

(*From Our Special Correspondent.*)

Atlas.—A careful examination has been made of this and the Red Rock copper properties in anticipation of a resumption of work, probably under one management. Under improved conditions of water and transportation, it is now believed that these properties can resume production at a profit.

Helvetia.—Development and production are being pushed in this district. The Helvetia mine, once a very considerable producer of copper, is being opened for further working; the Tip Top, better known as the old Columbia mine, is shipping a carload of ore every day to the smelter at El Paso, and announcement is made that development work is to be begun immediately on the Cuprite mine, which has recently changed hands.

Silverbell.—Since the completion of the Arizona Southern railroad from Red Rock to the Imperial mines the Imperial Copper Co. has been shipping daily 100 tons of high-grade sulphide ores to the smelter at Douglas.

Twin Buttes.—The Twin Buttes Railway Co. has been incorporated to build a standard gauge railroad from Tucson to the Twin Buttes mines, 25 miles south of that city.

CALIFORNIA.

AMADOR COUNTY.

Red Hill.—This mine, near Jackson, has been bought for $5,000 by W. E. Stewart, who has organized the José Gulch Mining Co. There is a mill on the property.

Zeila.—The repairs to the shaft have been completed at this mine at Jackson; a station is being cut at the 1,450-ft. level, and the sinking of the shaft, 200 or 300 ft. and opening new levels, is to begin at once. While the shaft is being sunk but half the stamps will be kept dropping. An electric pump is to be installed. W. F. Detert is superintendent.

CALAVERAS COUNTY.

Garibaldi.—This mine, near Sheep Ranch, has been taken by a company organized at Pueblo, Colorado.

Maltman.—This mine, at Angel, is to be actively operated by the Black Oak Gold Mining Co., which is working other properties in that district, and which has paid the debts that have encumbered the Maltman. Robert E. Walsh is general manager and superintendent.

Pilot.—This mine, near Cave City, has been bonded by Alex. Chambers and William Davey, of Angel, who will prospect at depth.

Royal Consolidated.—The company owning this property at Hodson has been made defendant in the Calaveras county superior court in a suit for $65,400 brought by Albert Raymond on three assigned claims for money, materials and electric power supplied. The suit is reported to be a feature of certain ownership troubles. J. C. Kemp Van Ee is manager.

ELDORADO COUNTY.

Church.—In this mine a body of good ore has been developed on the 100-ft. level. Seymour Hill is operating the property.

Coleman.—This mine, near Omo, has been taken by John L. Morrison and associates, who propose to develop the property, which includes an ancient gravel channel and a quartz ledge.

Franklin.—A roller mill is being built at Placerville for this gravel mine.

Fairchild.—At this property in Blair's district, H. G. Fairchild and E. Richards have reached pay gravel in an ancient lava-capped channel, to which the owners have been driving a tunnel for the past year.

NEVADA COUNTY.

Great Dane Mining Co.—This is a new incorporation, formed in San Francisco, with N. C. Larsen president and Edwin K. Peterson secretary. The company will operate a group of six claims near Nevada City. The claims include the Round Mountain, Champion and others. The shaft is down 125 feet.

Phelps Hill Mining Co.—This company, owning the Phelps Hill mine, has been reorganized, with W. P. Ketchum as president, D. E. Morgan secretary and treasurer, and W. T. Farrar, W. H. Martin, Fred Searls, J. C. Campbell and C. R. Quackenbush, directors. The intention to resume operations at the mine is announced.

SAN DIEGO COUNTY.

Free Gold Mining Co.—The third monthly report of Receiver H. A. Barker shows a bullion product for the month of $10,492, outstanding liabilities $7,895, and cash on hand $7,698.

Oriflamme.—This mine, five miles northeast of the Stonewall mine, has been bonded by W. J. Grigsby, of Banner, and associates. The mine has been opened by 1,000 ft. of workings and has a 10-stamp mill. It has been idle for 15 years.

SHASTA COUNTY.

Great Western Gold Mining Co.—The recent judgment for $40,000 secured by the company against James J. Chambers on account of misappropriation of funds has been appealed to the supreme court by the defendant.

Murray.—Mining has begun at this property; the ore goes to the smelter of the Mountain Copper Co., at Keswick, H. O. Cummings is the owner.

SONOMA COUNTY.

Culver-Baer.—This is a quicksilver property, owned by local people, on which development has been in progress for some time. It is reported that a valuably orebody has recently been developed.

TULARE COUNTY.

Yokohl Valley.—About 5,000 acres of land in this valley, eight miles from Exeter, in the Sierra foothills, have been leased from Fred and Will Gill by S. Thomas, J. D. Martin, et al. The lessees propose to mine the deposits of soapstone on the property on a considerable scale.

COLORADO.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

September Ore Shipments.—Shipments of smelting and crude ores, tailings and concentrates from the Black Hawk depot to the Denver and Golden smelters and to outside points of treatment were 275 cars, or 5,700 tons, a gain of about 10 per cent over the preceding month. Inasmuch as the former month showed an increase of over 20 per cent, indications tre that there will be a material gain in production during the last portion of the year. Some of the increased shipments may be traced to the low scale of prices for treatment offered for dry ores by the American Smelting and Refining Co. in Denver and by the Independent Smelting and Refining Co. at Golden.

Black Hills & Denver Mining Co.—This company owns 500 acres in the Kansas and Wisconsin districts, and contemplates installing an air compressor plant, erecting a concentrating plant and putting in its own power plant in the near future. Good values have been obtained on its mineral holdings and molybdenum ore has been opened up in the Park tunnel property. M. H. French, Denver, is manager, and the new officers are, president, S. H. Blakeslee; vice-president, W. W. Grant; secretary, J. M. Blakeslee; treasurer, L. A. White.

Ideal Gold Mining Co.—This company has resumed operations on the property on Tip Top mountain. G. E. Waite, Apex, is manager.

Missouri & Colorado Mining & Milling Co.—New shaft buildings are being erected at the Snowdon property, on Silver creek, and a steam hoisting plant is being installed. The new shaft is to be sunk several hundred feet this winter. Shipments to the smelters show average values of 3 oz. gold to the ton. W. C. Hollister, Apex, Colo., is manager. The company may decide to erect its own mill.

Rose County.—An examination of the surface workings of this property is being made down to the 300-ft. level in the interests of Eastern parties. The property is on Quartz Hill, in the Nevada district.

Spur Daisy.—Lessees are shipping surface ores from above the 100-ft. workings, which are ranging in values of from 8 to 17 oz. gold to the cord. The property is owned by Cleveland, O., parties.

Union Mining & Exploration Company.—Denver and Eastern parties are interested in a lease and bond on the Modoc mine on the "Patch" on Quartz Hill, and they are installing machinery and getting ready for active work, including the sinking of this shaft. Frank Soper, Central City, is in charge of operations.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

A few weeks ago the mine managers of the camp held a meeting and decided that the best course for them to pursue was to notify the miners working for them that they would be obliged to take out cards, to the effect that they did not belong to the Western Federation of Miners before they could find employment in Leadville district. This course was prompted for self-protection, on account of the large influx of miners from Cripple Creek, and to prevent a recurrence of the strike of 1896. Notices were posted in all the mines to the effect that no man would be employed at the property after October 1 unless he held a card from the Leadville District Mining Association. Every mine manager in the district belongs to the association. The men saw that it was a protection for them, and cards are being taken out as fast as the secretary of the association can issue them. The best of feeling exists between the managers and their men, and no trouble is anticipated.

Bwlgoch.—These mines, which for a number of years were operated by an English syndicate, are being worked on lease and bond by W. Kruizinga, the former superintendent. They are in the Red Mountain district, about 16 miles from Twin Lakes. Recently a fine body of ore has been struck, assaying $83.50 per ton.

Breece-Y Co.—This company is operating in Adelaide Park, under the management of J. J. Brown. The old Park shaft is being worked and a very fair grade of ore is being shipped. The Hub, a new shaft, is being sunk to catch the oreshoots from Carbonate hill and the Louisville shoot. The Ulster-Newton, near the Hub, is shipping a fair tonnage and opening up new ground.

Coronado.—The station at the bottom of the shaft at this mine is finished, and drifting has been started towards the Penrose, to open up the body of ore. The shaft passed through three different orebodies—iron, iron sulphide and copper sulphide—and the three combined make an oreshoot 150 ft. thick. The diamond drill found the same shoot at the Northern shaft, Tenth street, and also at the Penrose shaft, Fourth street, the ground all being owned by the Western Mining Co. The exact value of the ore has not been given out, but it is understood that it will run 20 oz. silver and about 10 per cent copper. The orebody has not been explored, but the drill holes show that it is fully 200 ft. wide, and one shaft has proved it to be 150 ft. thick.

Little Sister.—In this mine, on lower Rock hill, the drill has reached a depth of 575 ft. and is getting through the lake bed and entering the regular formation.

Reindeer.—This mine continues to ship steadily 100 tons of ore daily, in addition to development work being carried on in the orebody, which does not diminish. The Crown Point oreshoot is also being developed rapidly. On Rock hill and near the Reindeer five new shafts are being put down by different people.

Penn Mining Co.—Three shafts are being worked on the old Breece mine owned by this company, and some good silicious ore is being shipped by the lessees.

Yak Tunnel.—One mile from the portal a good body of ore was opened in the Tankerstown claim, east of the Moyer and next to the Bob Ingersoll. The ore is a clean copper sulphide, carrying good values in silver as well as copper. Work will be pushed on the strike to determine its size. The new electric engine should arrive this week, and when it does the big bore will be worked by electricity. Work is being pushed on the new reduction plant, and it is expected to be in good working order by the end of October. It will turn out 100 tons per day of a clean concentrate and materially add to the output from the tunnel.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

A raise in the treatment charges on the Cripple Creek ores has been announced. This chiefly affects the medium and higher grade ores, the lower grade ores remaining about the same. The reason given by the reduction companies for this is that the rates heretofore prevailing gave a very small margin of profit.

Beacon Hill.—The western slope of this hill still continues to be one of the busiest places in the district. Among other mines working in this section are the El Paso, C. K. & N., Old Gold, Henry Adney and Lonaconing. All these are shipping ore in more or less large quantities. Besides these are a number of smaller properties. On the Mary Nevin a shaft has been sunk to the depth of 50 ft., and it is understood that another contract will soon be let on it. Several of the rich ore shoots from some of the other properties are supposed to run into this property, and its development is being watched with interest. One of the latest strikes in this portion of the district is on the Silver Wave property, which is not far from the Lonaconing.

Cripple Creek Merger Gold Mining Co.—This company has purchased a number of claims in the district. Among those are several belonging to the Princess Alice Consolidated, some of which are situated on Bull hill, and some of the claims formerly owned by the Bonnie Nell Mining Co., on Raven hill.

IDAHO.

BANNOCK COUNTY.

Lost Packer.—It is reported that the Packer ledge has been struck in the long tunnel of this mine, at Pocatello. J. A. Czizek is the owner.

BINGHAM COUNTY.

Cariboo Gold & Copper Mining Co.—The shaft at this company's mine, near Idaho Falls, is down 130 ft., and a large body of ore is reported uncovered. Charles E. Miller is superintendent.

BLAINE COUNTY.

Red Elephant.—This mine, at Harley, is now shipping for the first time in ten years.

BOISE COUNTY.

Black Pearl.—The shaft at this mine, at Pearl, is down 370 ft., and is reported to have come into good ore.

CANYON COUNTY.

Dewey.—A good strike is reported at this mine, in the Thunder Mountain district. It is owned by E. H. Dewey and others.

CUSTER COUNTY.

White Knob Copper Co.—Coupons of the 6 per cent debenture bonds, due October 3, were not paid, because no funds had been provided. W. K. Mathews, of New York, and N. H. Clark have been appointed receivers by the Idaho courts. Mr. Mathews was vice-president of the company and Mr. Clark general manager of the mines, at Mackay.

INDIANA.

(*From Our Special Correspondent.*)

The Indiana coal mining industry is hampered by a shortage of cars for shipment of coal for domestic use, on account of the large number of cars on the railroad tracks loaded with steam coal. The condition is due to the unusually large output and the falling off in demand. The Big Four embargo on coal from the Sullivan and Green county fields continues. For two weeks fewer than 100 cars of coal destined for the gas belt cities have been accepted by the Big Four at connecting points. The Vandalia is accepting coal daily for northeastern Indiana, but the conditions remain serious.

LOUISIANA.

CALCASIEU PARISH.

(From Our Special Correspondent.)

Jennings.—The Mary Ellen well, owned by Berickenstein & Bass, is in and said to be gushing 5,000 bbl. daily. The well is 500 ft. from Morse No. 8. The owners have tankage for 75,000 bbl. and have started another well, 250 ft. east of the gusher. Six wells are flowing and 30 pumping out of about 90 wells drilled, and the present output is between 12,000 and 15,000 bbl. daily.

Welch.—The recently organized Louisiana Oil Co., capital $100,000, L. E. Robinson president, is drilling in the east portion of the field. The Rio Bravo Oil Co. has purchased most of the oil stored here.

MICHIGAN.

HOUGHTON COUNTY—COPPER.

(From Our Special Correspondent.)

Baltic.—Parts of the new hoisting engine for No. 5 shaft are beginning to arrive from the Nordberg Manufacturing Co., of Milwaukee, and the work of erecting it will be begun shortly. It has duplex cylinders 24 in. in diameter and 60-in. stroke. It is designed to raise 3 tons of rock from a depth of 3,000 ft. at the rate of 2,500 ft. a minute. The stamp mill is treating 2,000 tons of rock daily, the refined copper yield being a little better than 22 lb. to the ton. Underground conditions are satisfactory. A number of drills are engaged in development work. Recent openings in the southern portion of the mine reveal a more satisfactory lode than was encountered some months ago.

Champion.—At the stamp mill at Freda a number of improvements have been made in the concentrating department. These improvements consist mainly of the utilization of principles which have resulted from minute study of copper washing in the mills of the district, and they are giving excellent results.

Isle Royale.—Owing to the excessive overburden this company has discontinued work in its second pit on the Isle Royale lode, near section 16, of the Atlantic company. A diamond drill has been set up and will prove for the lode. As soon as it is located and the necessary data secured, work on an exploratory shaft will be started. The showing in the first shaft continues good, though not quite so rich as at first. Considerable heavy copper is being encountered, about 18 tons having been taken out.

Quincy.—Production by this mine has shown an increase each month this year, and culminated in a product of 950 tons of refined copper in August, the largest in its history. Last month's achievement was all the more notable, from the fact that No. 7 shaft was closed for repairs. This shaft is again in commission and forwarding 1,000 tons of rock to the stamp mills at Mason daily. The Quincy will probably exceed its 1903 production this year, notwithstanding the difficulties it has met. Its management shows a commendable spirit in adopting every improvement which will make towards lower copper costs.

ONTONAGON COUNTY—COPPER.

(From Our Special Correspondent.)

Michigan.—Increasingly good results are being secured from this mine. Five hundred tons of rock are being treated at the Mass mill each day, and the average mineral yield is 28 lb. per ton. Openings on the Branch vein and the Calico lode are extensive, and the stopes show a good run of ground. The Branch vein, while narrow, is richly mineralized. It is probable that this formation will be found to have merged with the Calico conglomerate at greater depth. The resultant lode should be a very profitable one.

Victoria.—This company has purchased the stamp mill of the Belt Mines Co., an English corporation, which is located on the Fire Steel river, less than a mile and a half from the Belt mine. A force of men has been engaged in taking it apart, and it will be removed to the Victoria's mill site. The mill was built by the Belt company in 1884, and is of wood on a stone foundation. The equipment consists of one Ball stamp, 40 jigs, three slime-tables and considerable miscellaneous machinery.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Bumblebee.—This mine, in Joplin, has just been sold for $25,000 to Mr. J. J. Wickham, who represents parties in Cleveland, Ohio. Mr. Wickham will settle in Joplin to take charge of the property.

MONTANA.

BROADWATER COUNTY.

Edward F.—It is reported that a mill is to be constructed for this mine, at Hassel. Edward F. Blewitt and others are the owners.

Hassel.—Allen C. Mason has secured control of 10 claims at this place, near Townsend. A 100-ton concentrator will be placed on the property.

FERGUS COUNTY.

North Moccasin Mining Co.—A large body of ore is reported struck on this company's property, near Lewistown.

LEWIS AND CLARKE COUNTY.

Parnell.—The Pittsburg & Montana company has purchased this group, comprising the Mexican, Humboldt and Copper Cliff claims, near Helena. The ore is to be used for the company's smelter.

ROSEBUD COUNTY.

A deposit of asbestos is reported on Bridger and Butcher creeks, in this county.

SILVER BOW COUNTY.

Alice.—Experiments are being carried on at this mine, at Walkerville, to determine whether the zinciferous ores can be treated and their mineral values saved and separated.

Storrs.—These coal mines, owned by the Amalgamated Copper Co., have been shut down, and it is reported that operations will not be resumed. Lack of coal is said to be the cause.

YELLOWSTONE COUNTY.

Shafter.—New machinery has been purchased for this mine, at Summit. A gasoline engine is to be used to furnish power.

PENNSYLVANIA.

ANTHRACITE COAL.

Delaware, Lackawanna & Western.—This company is installing machinery in the new breaker at its mine in Hanover township. It will have a capacity of 4,500 tons daily.

Plymouth Coal Co.—The creditors of this company recently received $50,000, which makes a total distribution of $500,000 in two years.

BITUMINOUS COAL.

Carrolltown.—Extensive improvements, including a new tipple and fans, are to be made in the mines of W. A. Gould & Bro., at this place.

Graceton.—The coal and coke plant at this place, which has been idle for a year, will be opened at once to its fullest capacity.

Keeling.—These mines, at Pittsburg, are to be equipped with electricity.

Keystone Coal Co.—This company has secured the Bennington coal mine, near Gallitzin, from the Pennsylvania Coal & Coke Co. The output will be used for the engines of the Pennsylvania railroad.

National Coal Co.—This company will open a large mine north of Canonsburg, where it owns a large block of coal land.

Pennsylvania Railroad Co.—Marcus Saxman, representing this company, has secured options on 5,000 acres of coal lands in the southwestern part of Indiana county. The reported price is $200,000.

United Coal Co.—This company has purchased a large tract of land in Somerset county.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Clara Belle Gold Mining Co.—A new boiler and pump are being set up at the shaft on this company's property, and the mill is making ready for a run. The mine is down 225 ft., and the best ore is being taken from a drift along the vein from the bottom of the shaft. It does not appear as rich as the specimens found near the surface, but the gold is more generally disseminated and the ore is quite uniform in value.

Grantz Gold Mining Co.—A contract has been awarded for running a drift 200 ft. from the bottom of the shaft. The St. Elmo shaft is 207 ft. deep. This property was purchased two years ago from the St. Elmo company. Otto Grantz, of Deadwood, is president and general manager.

Ivanhoe Gold Mining Co.—The new machinery at the shaft is in place, and sinking has been resumed, to continue to 500 feet.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Homestake Mining Co.—The annual report to stockholders for the year ending June 1, 1904, shows bullion receipts of $4,800,558. There were milled during the year 1,299,057 tons, and the average per ton was $3.695. The receipts from bullion during the year exceeded those of the previous year by $273,616, and the value of the ore per ton was better by $.156. During the period 19,982 tons more than the year before were milled. For labor there is charged $1,870,048. Of this $1,570,740 is charged under the head of mine. The next largest item in the schedule of disbursements is dividends, $655,200. There were paid during the year 12 monthly dividends of $54,600 each, or 25c. a share for the 218,400 shares of stock outstanding. T. J. Grier, superintendent, in his statement says: "The 1,100-ft. level reached a year ago in the Ellison shaft has been opened sufficiently to show that the ore vein being worked above that level continues to it, and also holds its width at that depth. The shaft has been sunk to 1,250 ft., where the next level will be opened." The 100-stamp addition to the Amicus mill has been completed during the past year, and nearly all the stamps are running. This gives the Homestake company 1,000 stamps, capable of treating 4,000 tons of ore daily.

Spearfish Gold Mining & Reduction Co.—The tonnage for September at the cyanide mill is 7,500, against 8,000 tons for the month of August. The record was reached last month. Two clean-ups have been made this month, valued at over $32,000. The company has driven 7,000 ft. of new tunnels and headers this year, and between January 1 and June 1 supplied this mill entirely from advance work. About half the supply for the mill now is from stoping. The ore ranges from $4 to $5 a ton.

Wasp No 2 Mining Co.—A blast was recently fired in this mine by which 6,000 tons of ore was broken, which, with the ore previously broken in a large blast, will supply the company's 125-ton cyanide plant until the close of the year. Fifty kegs of black powder were used for the shot. The Wasp No. 2 property is still under bond to the Venture corporation.

TEXAS.

HARDIN COUNTY.

(From Our Special Correspondent.)

Batson.—The new Wing gusher is said to be doing over 10,000 bbl. daily; the gas from it is very dangerous.

Saratoga. — The Guffey Petroleum Co. brought in a gusher at 1,300 ft. which is producing 1,000 bbl. daily, the quality being the best in this field. It has started another well. Sante Fe No. 5 struck artesian water, which has been cased off. The company has another well under way, and Crawford & Prather are also drilling a well.

LIBERTY COUNTY.

(From Our Special Correspondent.)

Dayton.—The H. L. Oil Co., of Houston, has started drilling, and the Bullard Wilson well is down 450 ft. Six wells have been drilled here, and while petroleum is found, it seems almost impossible to overcome the quicksand, water and the enormous gas pressure.

NACOGDOCHES COUNTY.

(From Our Special Correspondent.)

Nacogdoches.—The Vulcan Oil Co. has contracted for a well on the Wettermark property.

TYLER COUNTY.

Colmesneil.—Five wells are being drilled in this vicinity, that of the Oklahoma-Texas Co., near Schilling, being down over 1,300 feet.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Manila.—This property, about 4 miles west of Keller, in the Sans Poil mining district, has a very wide vein, which has been partially developed by two tunnels. The upper one, in 160 ft., intersects an orebody across 80 ft., at a depth of 120 ft. The ore is said to average about $12 per ton in copper, gold and silver, and is highly silicious. The lower tunnel, in about 400 ft., strikes the footwall at 175 ft., and intersects the vein diagonally about 200 ft., at a depth of about 270 ft. The ore is also disclosed in solid mass in about 150 ft. of lateral workings. The whole material on this level, averaging about $8 per ton, carries from 80c. to $1.30 marketable value in copper, with the balance about equally divided in value between silver and gold. The last assay from the face of the main tunnel ran $14 per ton. This property is under bond to the Belcher Mining Co. for $40,000, payable in instalments.

Belcher Mining Co.—This company has purchased 160 acres of placer ground at West Fork, 15 miles south of Republic, and acquired 40 acres more by location, with the object of installing a smelting plant to reduce the ores from the Belcher mine, situated about 28 miles north, and the Manila mine, about 37 miles south. Ditch and water rights have been also secured. It is proposed to instal a plant as soon as possible and to begin preparatory work at once, and later to instal a lead smelting furnace and be in a position to purchase custom ores of various kinds. This enterprise will be in a great measure dependent on transportation facilities, and has been projected in the belief that a railroad will soon be constructed through the Sans Poil valley, from Republic to the big bend of the Columbia river.

AFRICA.

RHODESIA.

The Rhodesia Chamber of Mines reports that the total output of the gold mines in August was 24,669 oz. bullion. This is 330 oz. more than in July and 5,482 oz. more than in August, 1903. It is the highest monthly production ever reported. For the eight months ending August 31 the total was 162,505 oz. bullion, which compares with 160,750 oz. in the corresponding period in 1903, showing an increase of 1,755 oz. The bullion reported this year was equal to 144,629 oz. fine gold, or $2,989,481 in value.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending September 24 were as follows, in tons: Granby, 11,370; Mother Lode, 8,616; Emma, 1,188; Mountain Rose, 66; total for week, 16,240 tons; total for year to date, 582,699 tons.

Granby Consolidated Mining & Smelting & Power Co.—Mr. S. H. C. Miner has retired from this company, and a new board of directors, including the following, has been elected: John Stanton, president of the Wolverine and the Mohawk Mining companies; President Nichols, of the General Chemical Co.; President Langeloth, of the American Metal Co.; George C. Clark, Arthur C. Janes, George F. Baker, Jr., Harry Payne Whitney and W. R. Higginson. These gentlemen represent New York and Boston interests, and their election signifies the passing of the control of the company into their hands.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for the week ending September 24 were as follows, in tons: Le Roi, 2,250; Centre Star, 1,440; War Eagle, 1,230; Le Roi Two, 450; Le Roi Two (Elmore), 300; Jumbo, 300; Velvet-Portland (milled), 250; I. X. L. (milled), 4; White Bear (milled), 50; total, 6,274; total for the year, 258,182 tons.

MINING STOCKS.

(Full quotations on pages 574 and 575.)

New York. Oct. 5.

The realization of the highest prices this year on United States Steel securities; the stability of the demand for American Smelting & Refining shares, and the apparent determination of those affiliated with insiders to instil new life in the coppers, have combined to give the stock market a more healthy appearance. In fact, prices generally have strengthened.

United States Steel shares were dealt in largely, and while the common touched $19⅜, the preferred jumped to $76⅞, principally because there had been rumors that a renewal of the conversion plan is pending. These reports have been officially denied. American Smelting & Refining common stock rose to $67.50, and the preferred to $108 on conservative trading. On this basis the common shares yield in dividends more than the preferred, although on the par value of $100 for each, the difference in favor of the preferred is 2 per cent per annum.

In the copper list Amalgamated shows better form, because, as it is reported, certain insiders are rendering aid to the bull element. As high as $60.00 has been quoted this week. Anaconda is exceptionally quiet. Greene Consolidated, of Mexico, has been stimulated by the report that foreigners are becoming interested in the property; the stock advanced to $19.875. Heinze's United, after a long absence, has reappeared with a small sale at $6 for the common stock. British Columbia is higher at $4.375. White Knob, of Idaho, is apathetic, because the management is unable to meet the interest of $30,000 on the 6 per cent first mortgage bonds. It is expected that some plan will be devised by the directors to reimburse the treasury so that the pecuniary obligations of the company may be equitably adjusted. Tennessee brought $32.875.

Ontario Silver, of Utah, has changed hands at $4@$3.90, Standard Gold, of California, at $2.10, and Quicksilver preferred at $3.75, the latter being the first transaction in a long while.

In the Cripple Creek, Colo., gold stocks some interest was shown in Portland at $1.60, Elkton Consolidated at 61c., and Isabella at 19c. The Comstocks were quiet, Ophir selling at $2.50, and Consolidated California & Virginia at $1.60 per share.

Boston. Oct. 4.

(From Our Special Correspondent.)

Activity in this market during the week has been confined to specialties, but outside of these, movements have been confined to narrow margins. Extra large transactions are to be recorded in Granby Mining, with the result that the price has risen 75c., to $4. Current reports were that J. J. Hill would turn up in control, but this was not substantiated at the annual meeting, which was held in Montreal to-day. Profits for the year were but $283,000. Although Amalgamated touched $60 in both markets, it had no perceptible effect on the copper share list. Trinity settled almost $1, to $7.50, with subsequent recovery to $8.25. The decline was due to an unfounded rumor of the serious sickness of its sponsor, Mr. T. W. Lawson. A series of letters have been published on this property by one of the original holders, but nothing particular has come from them as yet.

Old Dominion spurted $2, to $19.62½, on information that the smelter had been started and was running satisfactorily. Shannon has also been in good request, and has advanced $1, to $5. The selling from inside sources has apparently come to an end, and the stock is in request as a result. Wyandotte touched $1, on knowledge that a strike had been made at the property. Allouez broke $3, to $12.50, but rallied to $14.25, closing at $13.25. It was expected that the Kearsarge lode would be tapped before this, and the decline was due to this cause. It seems, however, from latest accounts, that the lode has been cut, but an accident to the diamond drill has deferred actual knowledge of the results. Michigan touched $7.25 during the week; Mohawk, $48, and United States, $21.50. Dominion Iron & Steel pushed up $2.75, to $15, on a little speculative movement, and has held the advance.

Copper Range has been more or less dead, with fluctuations between $57.87½ and $56.50, closing at $57.62½. The matter of a dividend on this stock, it is now expected, will be deferred until next year, as the new Michigan smelter has not been able to handle the mineral offered. Notwithstanding the September product was the best yet, Utah closed a trifle better than a week ago, at $41, although it sold both below and above this price, and Osceola rose $2.25, to $82.25. Wolverine is back to $90 again. Calumet & Hecla is firm around $520, and Tamarack around $116@$119. Isle Royale, on light trading, advanced $1.37½, to 021.87½, but lost it. Shmeek touched $33 on the outside market.

San Francisco. Sept. 29.

(From Our Special Correspondent.)

Business in the Comstocks has been rather good this week, and prices showed up somewhat better accordingly. There were sales of Ophir at $2.45; Consolidated California & Virginia, $1.30; Mexican, $1.15; Exchequer, 55c.; Sierra Nevada, 39c.; Belcher, 35c.; Gould & Curry, 25c.; Potosi, 19c. per share.

On the San Francisco & Tonopah exchange prices were fairly steady and there was considerable interest manifested in the leading stocks. Tonopah of Nevada brought $8.25@$8.50; Montana Tonopah, $1.92; MacNamara, 39@40c.; Tonopah Gold Mountain, 16c. per share.

On the California exchange sales of oil stocks were small and there were no special features to the market. Reed Crude was quoted at $1.50; Claremont, 75c.; Monte Cristo, 63c.; Oil City, 52c. per share.

Monterey. Sept. 23.

(From Our Special Correspondent.)

Exchange on New York opened Monday of last week at 215, advanced to 215¼ during the week, but closed on Saturday at 215. Mining stocks were somewhat more active than for several weeks. Of El Oro stocks, Dos Estrellas brought $2,200; Aldebaran, $59; Buen Despacho, $55; Septentrion, $40; Equidad, $28, and Santa Rosa, $3; Trinidad, of Charcos, San Luis Potosi, $7; La Paz, Matehuala, San Luis Potosi, $2.10. In Pachuca, La Blanca y Anexas Gold at $390; Amistad y Concordia, $78; Santa Gertrudis, $77; Bartolome, $100, and Soledad, $1,000.

COAL TRADE REVIEW.

New York, Oct. 5.

ANTHRACITE.

The anthracite coal trade remains quiet, the expected revival in buying not having developed as yet. Weather conditions have deadened interest, after a slight increase in demand had followed recent cold waves. All companies continue to restrict the output of collieries, keeping shipments down to what they believe the market will take. Some mines are shut down for a few days or a week at a stretch, and some for longer periods, each company following its own policy in this regard. The market for the steam sizes has shown a little improvement of late, and the proportion of these sizes made by the breakers is readily absorbed. Numerous washeries, however, remain closed, and will not start up until the coming of cold weather. The output for September has not been officially estimated, but is expected to be less than August.

Nothing has been heard recently of the suits brought by the Interstate Commerce Commission against the anthracite railroads, and the suits have possibly been definitely dropped.

Trade in the Northwest is fairly active, and some improvement is noted in the movement of coal from docks, thereby lessening the delays for vessels unloading. In Chicago territory buying has dropped off again, and trade is generally quiet. Supplies of coal on dock are light, and if the winter is at all severe a shortage may develop before navigation opens in the spring. Along the lower lakes and in

Canadian territory there has been little increase in demand, and trade conditions are practically what they have been for several weeks. Along the Atlantic seaboard some improvement is noted in all-rail shipments, but business at tidewater ports remains light, and awaits the coming of colder weather for improvement. At New York harbor there is a very fair market for what small sizes are arriving, particularly for No. 2 buckwheat. Prices for prepared sizes remain at circular figures—$5 for egg, stove and chestnut, and $4.75 for broken. Prices of the steam sizes differ somewhat, but the principal companies quote the prices that, except for a short interval, have prevailed since last January. These are $3 for pea, $2.50 for No. 1 buckwheat and $1.80 for No. 2 buckwheat, f.o.b. New York harbor shipping port.

BITUMINOUS.

There is little or no change in the seaboard bituminous market. Orders are coming in somewhat more freely, and locally prices are a little stronger, though the change is really confined to the lower grades, which are feeling most of the increased business. Producers of the better grades seem to have orders enough at hand to keep fair tonnages moving, according to the present output.

Trade in the far East continues to take considerable coal, with some receiving ports so blockaded that facilities for discharging cannot be found fast enough to keep up with the tonnage arriving. Along Long Island sound trade continues to hold its improvement, and coal is going to that territory in about the old quantity, although no one feels sure that this movement will continue. At New York harbor points the market is quiet. Prices range around $2.40@$2.50 for fair grades of Clearfield. There does not seem to be much demurrage on coal on the market, and this factor helps the situation.

Transportation from the mines to tidewater is variable. Cars are in short supply on the Norfolk & Western, Chesapeake & Ohio and Beech Creek, but no complaints are heard from shippers over the other roads. In the coastwise vessel market there seem to be vessels enough for all demands. It is noted that some of the members of the Coastwise Carriers' Association that would not charter under the Association rates before October 1, have taken charters since. This seems to indicate that the agreement which was to expire on October 1 has not been renewed. We quote current rates from Philadelphia as follows: Boston, Salem, Portland and Bath, 75c.; Providence, New Bedford and Long Island sound, 60c.; Lynn, Newburyport and Bangor, 85c.; Portsmouth, 80c.; Gardiner, 80c. and towages; Saco, 90c. and towages. Rates from New York harbor are 50c. to points beyond Cape Cod.

Birmingham. Oct. 3.

(From Our Special Correspondent.)

The strike of the union coal miners in Alabama is still on, and the companies whose mines are affected claim that they will fight for the "open shop" to the finish. Quite a number of men are being brought into the district to go to work in the coal mines, many of them from West Virginia. The coal production at the mines where men are out on strike is improving right along, notwithstanding denials by the leaders of the miners. The Tennessee Coal, Iron & Railroad Co. is getting out a good quantity of coal now at the following mines: Adger, Johns and Sumter, in the Blue Creek region of Jefferson county; at Blocton, in Bibb county; at Nos. 3 and 5 in the Pratt division. During this week efforts will be made to start two other mines in the Pratt division. The Sloss-Sheffield Steel & Iron Co. is getting out about 1,000 tons of coal per day from the mines at Blossburg, New Found and Coalburg, where union miners formerly were employed. The Lacey-Buek Iron Co. is getting out almost a normal output at the Graves mines. The Republic Iron & Steel Co. is mining coal at Warner mines right along. The Tutweiler Coal, Iron & Railroad Co. is getting out coal also at Blossburg mines. The leaders of the United Mine Workers assert that they have not lost the strike by a good deal, and that they are not thinking of giving up. President Edward Flynn, of the miners' organization, admitted when questioned that a number of non-union men were being brought into the district, but he says that there is much unskilled labor in the lot, that many are quitting as soon as they find out the real situation, and that the coal mined is not only expensive, but is not the best of product, being dirty and unfit for usual purposes.

President J. C. Maben, of the Sloss-Sheffield Steel & Iron Company, stated during the past week that his company would not sign a contract with the unions any more, that the "open shop" was desired and would be fought for. At the commercial coal mines, convict mines and non-union mines there is a healthy production.

Up to October 1 this year 59 men lost their lives through accidents in the coal mines. During the year 1903 only 57 lives were lost in the mines. The State Mine Inspector is urging all superintendents, bank bosses and other officials about the mines to caution the men to be as careful as possible in their work.

The Blount Mountain Coal Company has been incorporated, with a capital stock of $50,000, to mine coal in Blount county. The headquarters of the company will be in Birmingham. The incorporators are F. W. Hopkins, M. O. Hopkins, E. M. Spence and T. F. Wood, of Birmingham, and M. E. Partie, of Swansea, Ala.

There is still some coke being imported into the district. The production of coke in this State is increasing.

Chicago. Oct. 3.

(From Our Special Correspondent.)

Wholesale business in anthracite is again dull, the briskness of a week to two weeks ago proving only temporary and due to a passing spell of cold weather over the upper Mississippi Valley. City business is improving slightly, but cannot compare yet with the business of a year ago. The same comparison obtains for country trade in western territory; in the Northwest the demand is heavier, but not up to the record of last year. Country retailers say their customers anticipate a mild winter, as a sequence of a cool summer and a winter of unusual severity in 1903-4. Receipts by lake here are still insufficient to make up the loss early in the season, and Chicago territory will go into the winter with a small supply on the docks. If the winter is severe we shall see the dock supplies exhausted early, and then there will be trouble for the railroads, wholesalers, retailers and consumers.

There is still a lack of sufficient demand to take care of the bituminous coal reaching the local market from Indiana and Illinois mines, and consequently the market is dull. Fine coals particularly are affected by this condition and are being sold at a loss generally. It is probable that this condition will continue until mid-winter, in default of any concerted action by operators toward restricted output. Domestic sizes of western coal are in good demand, and prices are firm. On some grades, indeed, an advance of 10 to 15c. has been made for October trade. Quotations on western are: Lump, $2.10@$2.50; run-of-mine, $1.40@$1.70; screenings, 75c.@$1.25.

Eastern bituminous continues to sell well, and everything indicates continued steadiness of the market. Smokeless is increasing in demand, run-of-mine being held up well to $3, and lump and egg bringing $1 more. Hocking brings $3 and is in better supply, though with no surplus. If the sale of western coals was anywhere nearly so good relatively as the sale of eastern, mine owners and agents would feel upon a sure footing.

Cleveland. Oct. 4.

(From Our Special Correspondent.)

The coal situation is improved, in sentiment at least. The operators are beginning to find a shortage of cars, which is more or less serious, and they are trying to avoid it by importuning the railroad managers to give them a better supply. The ore shippers have been moving ore rather rapidly. Finding the docks congested with that material, they have been sending the ore to the furnaces in cars. The latter are dilatory about unloading, and this has contracted the supply of cars available for the coal trade. The situation has left the coal operators in a position where they are hardly able to supply the demand. The demand for steam coal seems to be considerably stronger, indicating a degree of industrial activity which has not been seen for some time. Prices have stiffened. It is hardly believed that any one will sell run-of-mine coal for less than $1 at mine, either in the Pittsburg or the Ohio field. The slack market is a little stronger, with prices holding about 30@35c. at mine, with contracts demanded on the basis of about 50c. at the mines. There is an improved tone in the domestic coal market. In the Massilon field the mine operators are not able to supply the demand, due to a shortage of cars. The cooler weather of the past few days has brought out good buying. The lake coal conditions do not change, the upper lake docks being still congested, although the railroads are finding a better demand through the Northwest, and are forced to move much of the material.

Pittsburg. Oct. 4.

(From Our Special Correspondent.)

Coal.—The formal transfer of the properties of the Pittsburg Terminal Railroad & Coal Co. to the Wabash is reported to have been made yesterday, but arrangements have not yet been completed for the operation of the coal mines. The old management—Patterson & Robbins, the Pennsylvania interest of the Youghiogheny & Ohio Coal Co.—is still in charge. It is said the latter has made a strong bid for the control of the mines. The Consolidated Coal Co. of St. Louis, a Wabash company, it is reported, may be put in charge of the mining operations in this district. There is still a shortage of railroad cars for the coal trade, but the service was a trifle better last week than the previous week. The demand is improving and prices are firm, the minimum quotation for run-of-mine coal being $1.05 at mine.

Connellsville Coke.—Production and shipments continue to increase and prices are firm. Furnace coke is quoted at $1.50, and some sales are reported as high as $1.60. Foundry coke remains at $1.85@$2. According to the *Courier*, the official organ of the coke region, the production last week was 215,683 tons, compared with 209,791 tons the previous week. The shipments aggregated 11,423 cars, distributed as follows: To Pittsburg and river points, 3,809 cars; to points west of Pittsburg, 6,291 cars; to points east of Connellsville, 1,323 cars. This was a gain of nearly 400 cars.

San Francisco. Sept. 29.

(From Our Special Correspondent.)

The circular of Mr. J. W. Harrison, under date of September 29, says: "Since our last there have been five cargoes of Australian coal received; total, 13,522 tons. There are seven cargoes of Newcastle coal which are expected to arrive here, prior to November 1; these seven added to the quantity now in yard will be ample supply for all local requirements for the next two or three months. There are 28 vessels at present on the engaged list, to transport Australian coal here, with a carrying capacity of about 70,000 tons. Several of these cargoes will not arrive here prior to the end of the year. In September, 1903, 13 cargoes, carrying 44,147 tons of Australian coal, were delivered here; for the same time this year we have had but five arrivals from Newcastle with 13,522 tons. But few names of coal carriers are being added to the loading list, partially because the asking freight rate from Newcastle is too high, and the demand at this end is diminishing. The competition offered by our northern coast collieries has served to cut down values very materially. The proximity of the winter months is already being felt, and the domestic fuel trade is becoming active; this will serve to materially decrease the stocks of colonial coal now on hand. Coal as a steam fuel is gradually losing its hold among large consumers locally, as they are substituting fuel oil for their purposes. Prices generally remain unchanged."

Prices show very little change. For Pacific Coast coals in large lots to dealers quotations are: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, also in large lots to dealers, prices named are $8.50 for Castle Gate, Clear Creek,

Rock Springs and Sunnyside; Colorado anthracite brings $14. For Eastern coal, quotations are largely nominal, supplies being light. Pennsylvania anthracite is $14 and Cumberland, $13. For English coal, quotations are, ex-ship: Welsh anthracite, $13; Cannel, $8.50; Wallsend and Brymbo, $7.50 per ton.

Foreign Coal Trade. Oct. 5.

Exports of coal and coke from the United States for the eight months ending August 31 are reported as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1903.	1904.	Changes.
Anthracite	1,542,173	1,620,264 I.	78,091
Bituminous	4,008,761	4,057,250 I.	48,489
Total coal	5,550,934	5,677,514 I.	126,580
Coke	268,510	352,774 I.	84,264
Totals	5,819,444	6,030,288 I.	210,844

The coke exports are chiefly to Mexico. The coal exports were distributed, as shown in the following table:

	1903.	1904.	Changes.
Canada	4,404,479	4,297,444 D.	107,035
Mexico	552,603	621,908 I.	69,305
Cuba	265,143	295,301 I.	30,158
Other West Indies	139,646	176,556 I.	36,910
France	3,320	9,770 I.	6,450
Italy	37,615	65,462 I.	27,847
Other Europe	17,970	45,467 I.	27,497
Other countries	130,158	165,606 I.	35,448
Totals	5,550,934	5,677,514 I.	126,580

The decrease in exports to Canada was entirely in bituminous coal, which fell off 186,261 tons, while anthracite increased 79,226 tons.

Imports of coal into the United States for the eight months ending August 31 are reported as follows:

	1903.	1904.	Changes.
Canada	1,126,927	809,842 D.	317,085
Mexico	5	221 I.	216
Great Britain	1,229,363	56,195 D.	1,173,168
Other Europe	381	50 D.	331
Australia	240,928	146,165 D.	94,763
Japan	33,134	39,876 I.	6,742
Other countries	1,019	759 D.	260
Totals	2,631,757	1,053,108 D.	1,578,649

Of the imports this year, 23,577 tons were classed as anthracite, the balance being bituminous coal. Imports this year were chiefly on the Pacific coast.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of September 24, that the coal market continues weak and unchanged. Quotations are: Best Welsh steam coal, $3.54; seconds, $3.36; thirds, $3.24; dry coals, $3.30; best Monmouthshire, $3.18; seconds, $3.12; best small steam coal, $1.98; seconds, $1.74; other sorts, $1.62.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2.5% discount.

There is no change in the freight market, which remains very quiet. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.14; Naples, $1.14; Las Palmas, $1.32; St. Vincent, $1.44; Rio, $2.04; Santos, $2.46; Buenos Aires, $1.68.

IRON TRADE REVIEW.

New York, Oct. 5.

The iron and steel markets continue to show an improvement. Business is more active, and orders are being placed more freely. Moreover, inquiry for deliveries in the first quarter of next year is developing, which is an encouraging sign of belief in the stability of business.

Naturally, the pig iron market is the first to show the improvement, and transactions for the week have been on a considerable scale. Most of these—probably all of them—are on current low prices, but it is significant that there is no sign of further shading.

In finished material it is very much the same. Bars and plates show an improving business. Structural material is quiet, but it must be remembered that the season for large structural orders has practically passed. Inquiries, however, are quite frequent. Mills generally appear to be in better shape, so far as orders are concerned, and this is shown by the anxiety to settle the small labor troubles which are cropping out here and there.

We hear little these days about export business. It is understood that there is considerable business being done, or under negotiation, but the matters are kept very quiet. The August exports show a slight decrease, as compared with previous months.

Exports and Imports.—Exports of iron and steel, including manufactures, from the United States for August and the eight months ending August 31 are valued by the Bureau of Statistics of the Department of Commerce and Industry as below:

	1903.	1904.	Changes.
August	$8,237,519	$10,430,331 I.	$2,192,812
Eight months	65,341,010	81,415,122 I.	16,074,012

The gain for August was 26.6%; for the eight months it was 24.6%. The leading items of these exports were as follows, in long tons:

	1903.	1904.	Changes.
Pig iron	10,864	27,639 I.	16,775
Bars	27,231	37,353 I.	10,122
Rails	5,124	210,321 I.	205,197
Sheets and plates	11,228	26,766 I.	15 538
Structural steel	20,670	31,153 I.	10,483
Wire	70,124	72,858 I.	2,734
Nails	27,607	27,080 D.	527

The largest increase was in rails. Of the exports of rails this year, 93,256 tons went to Canada, 44,060 tons to Asia, 20,777 tons to Japan, 18,589 tons to Mexico, and 15,595 tons to South America. Exports of iron ore were 26,743 tons in 1903 and 74,347 tons in 1904, an increase of 47,604 tons, which was largely due to special shipments made to Germany.

Imports of iron and steel into the United States for August and the eight months ending August 31 were valued as follows:

	1903.	1904.	Changes.
August	$3,440,100	$1,751,822 D.	$1,688,278
Eight months	32,289,525	14,749.825 D.	17,539,700

The decrease for the eight months was 54.3%. The chief items of these imports were as follows, in long tons:

	1903.	1904.	Changes.
Pig iron	530,972	51,943 D.	479,029
Billets, blooms, etc	229,680	8.197 D.	221,483
Scrap iron and steel	72,139	13,936 D.	58,203
Bars	29,598	14,656 D.	14,942
Wire-rods	13,920	10,746 D.	3,174
Rails	85,077	34,229 D.	50,848
Tin-plates	33,771	49,242 I.	15,471

Imports of iron ore for the eight months were 723,325 tons in 1903 and 238,576 tons in 1904, showing a decrease of 484,749 tons this year.

Birmingham. Oct. 3.

(From Our Special Correspondent.)

There is some improvement noted in the Alabama iron market conditions. The demand is a little better and there is a fairly good inquiry. The production will be improved some this week by the blowing in of two furnaces, the Tennessee Coal, Iron & Railroad Co. making preparations to resume work at two of the Bessemer furnaces. This company is now getting a good supply of coal and coke from the Blue Creek colliery, in Jefferson county, and has started up the mines in Bibb county, notwithstanding a continuance of the miners' strike. The iron production shows no change as yet of any consequence, though the new furnace of the Lookout Mountain Iron Co., at Battelle, in De Kalb county, has already attained a daily output of 200 tons. The Sloss-Sheffield Steel & Iron Co. has five furnaces in operation and shipping about their make. The Alabama Consolidated Coal & Iron Co. continues steady operation at three furnaces, two at Ironton and one at Gadsden.

During the past week quite an amount of iron was sold, and there are no fears that there will be a considerable accumulation during the last quarter of the year. The quotations show no changes, but are a bit firmer. The larger manufacturers are holding their product on a basis of $9.50 for No. 2 foundry, and have given out a statement that rather than sell under that price they will prefer to accumulate; in fact, one of the higher officials of one of the larger companies in this district went so far as to get authority from his board of directors to carry out this idea.

The following quotations are given for iron: No. 1 foundry, $10; No. 2 foundry, $9.25@$9.50; No. 3 foundry, $9@$9.25; No. 4 foundry, $8.75; gray forge, $8.25@$8.50; No. 1 soft, $9.50@$10; No. 2 soft, $9.50.

The finished iron and steel trades in this section show no change. Only one rolling mill plant is in operation, and that is the Bessemer mills belonging to the Tennessee Coal, Iron & Railroad Co., where non-union men are given employment. Three departments are producing finished iron and steel, but the production is not very great.

Cast iron pipe plants in this section are still busy, and will be for some months to come. The announcement is made that the Panama water-works contract for a large quantity of pipe was given to the Unitel States Cast Iron Pipe Co., the pipe to be furnished by the Anniston (Ala.) plant.

By Telegraph.

Birmingham, Ala., October 5.—The Tennessee Coal, Iron & Railroad Co. has blown in one of its furnaces at Bessemer, and it is making iron to-day. The Republic Iron & Steel Co. will resume operations at its Birmingham rolling mills on Monday next, employing 700 men. There is a great improvement in the demand for iron.

Chicago. Oct. 3.

(From Our Special Correspondent.)

Firmness characterizes the market for pig iron, there being no indications of a relapse in the volume of sales or in the prices. Both northern and southern iron are in very good demand, and sales are running as far into next year as selling agents are willing to have them run. The consumer continues to be more eager on this point than the seller. One large house reports that the demand for northern is increasing at such a rate that prices are bound to go up—that there is no such thing possible as standing still, from all indications, the signs all pointing to a steady advance. The history of the local trade would seem to bear out this prediction.

Some of the agents are said to have refused large orders at present prices on account of their unwillingness to contract heavily for 1904. They are willing to make contracts, however, on the basis of 50c. to $1 more than the prices now prevailing, but this stiff requirement does not meet the approval of would-be buyers. It is evident from the situation that furnacemen believe in the market's advancing, and the same opinion is manifested by the users of iron.

In volume, sales of the last week have been about the same as sales for the previous week, which means better business than has been done in any previous two weeks for many months. The unwillingness of agents to contract for large tonnage has kept orders down to small to medium lots, with nearly all the business on 60 to 90 day contracts.

Coke is in better demand with no surplus on track, and the price around $4.65 for Connellsville.

Cleveland. Oct. 4.

(From Our Special Correspondent.)

Iron Ore.—The movement down the lakes has increased since shippers are finding themselves short of what they will need, and the season is likely to close early. The rates of carriage have advanced 5c. all around, and another advance is likely, because the docks are crowded and dispatch of the boats is poor. Prices are holding about as they have been. Sales are very light. The rates of carriage are 70c. from Duluth, 65c. from Marquette, and 55c. from Escanaba.

Pig Iron.—The market is extremely dull. Prices are inclined to be easier for foundry and steady for bessemer. The feeling is confident all through the trade, but it is now quite evident that buyers balked seriously at the effort of the producers to advance prices, and this has brought the producer to a different mind about trying to market his material. The buying for the time being has stopped from those furnaces which are well enough fixed to demand $12 to $12.25 for No. 2 foundry. Other furnaces are selling the generality of their material at $11.75 in the valleys, and are able to make some small sales now and then.

Finished Material.—There has been much better buying of late in those materials on which prices have been cut. A part of this business has been created by the fact that prices were cut, but a good part of it has come out, having been held back. This is especially seen in the plate and structural trades, where conditions are almost identical. The leading feature in both trades is the buying of the shipbuilding companies, these having some orders

on their books, new ones just placed, and more in prospect. There is also a little better buying in billets. The material now coming out seems to have been held back, although competitive conditions before had brought out most of the material which was seeking a low price. This market, therefore, seems to be on a good foundation.

The best buying of the year is now being seen in the plate trade. Prices are steady, and the orders are enough to keep almost all of the mills busy. The cut in the price of bars did not coax out any of the laggard business. The market has been extremely easy. In bar iron especially the market has not only been easy, but soft. Some of the mills are trying to hold for 1.30, but, finding that futile, are drifting to the level dictated by the stress of competition, which finds expression at about 1.25c.

New York. Oct. 5.

Pig Iron.—The market shows no especial features. For northern iron we quote: No. 1X foundry, $14.75@$15; No. 2X, $14@$14.40; forge, $13@$13.25. For southern iron on dock prices are about as follows: No. 1 foundry, $13.50; No. 2, $13@$13.25; No. 3, $12.75@$13.

Bar Iron.—Prices have been reduced, but business is light. We quote refined iron bars at 1.445@1.495c.

Plate.—Buying is mostly of the hand-to-mouth kind; anything over 100 tons is called a large order. The recent price reductions have not affected the volume of orders. We quote 1.545c. for ¼-in. tank plate in carloads at tidewater, with other grades in proportion.

Steel Rails.—Quotations are still $28 for standard sections, f. o. b. mills. Quotations for light rails range from $19 for 40-lb. up to $22 for 12-lb., f. o. b. mills in large lots.

Structural Material.—The demand shows little change. We quote on large lots at tidewater, 1.55@1.80c. for beams, angles and channels.

Philadelphia. Oct. 4.

(From Our Special Correspondent.)

A perceptible increase in pig iron sales is reported by our leading brokers and furnace representatives. Particular attention has been called to both basic and bessemer, and large contracts have been secured, some of which run, it is asserted, up to next spring before the last deliveries will be made. In some of the contracts the stipulation is made that renewals can be made within 60 days for additional material, on the basis of the present price—$12. Foundry iron is also showing improvement, and agents report quite a run of visitors, and an increase in correspondence for all grades of foundry. No. 1 is very firm, and one or two brands have been quoted 25c. higher for early deliveries, as the furnace people have already booked contracts for all they can make for nearby delivery. No. 2 is meeting with better sale, but it shows no signs of hardening. Iron for casting purposes is also under active inquiry. Quotations are $15 to $15.25 for No. 1; $14.50 for No. 2; $13.50 for No. 2 plain; standard forge, $13; basic, $12.75; low phosphorus, $17.50.

Bars.—Within a few days both store and mill business has improved, and buyers, who have been purchasing in the smallest way possible, are now making more liberal provision.

Billets.—Open-hearth steel is selling at $22@$22.50, and it is probable that $21.50 is the bottom price for large lots said to be in negotiation.

Sheets.—For some time past the sheet people have been giving a rather disappointing view of the market, but within three or four days buyers have been appearing.

Pipes and Tubes.—While there is no definite change nor pronounced improvement, the agents of mills say there is inquiry that points a more lively demand in a short time.

Merchant Steel.—The buyers of merchant steel in this market hear rumors from the West that there are some shadings being made. Agents of mills state that if there is any truth in these rumors, it applies only to the very large dealings which it is customary to make at this season of the year.

Plates.—The shipbuilding interests will very soon be in the market, so it is rumored here, for an unusually large quantity of plate. The general demand for plates is better than it has been since last spring. Quotations are firm at the lower level. Tank is quoted at 1.48½@1.58½, according to width. Flange and boiler steel, 1.68½; marine and fire-box steel, 1.78½; locomotive fire-box, 2.08½c.

Structural Material.—The revised quotations are acceptable to the smaller buyers, but it is intimated that the bridge-building buyers have an understanding by which their material eventually costs them a good deal less. More work is coming in sight for the winter, but there is no business on hand just at present to warrant any very specific statements.

Old Rails.—Old rails are quoted at $16, with some business at $15.50.

Scrap.—Scrap is creeping up slowly under more active buying and under the effecting of arrangements with some scrap men to furnish certain kinds of scrap during the winter. This has the effect of lessening the amount of scrap that will be available. Old car wheels are nominally $12; choice railroad scrap, $15.50; machinery sold this week at $11.50 per ton.

Pittsburg. Oct. 4.

(From Our Special Correspondent.)

Increased confidence in the iron and steel markets is evidenced in the placing of orders for extended delivery. The mills and furnaces in the Pittsburg district are busy, and foundries continue to buy iron for shipment during the entire fourth quarter. Sales of foundry and forge iron during the past week aggregated fully 25,000 tons, and for the month of September it is estimated that about 75,000 tons were sold. Prices are firm, and the buying movement has been encouraged by the fact that furnaces have not advanced prices on account of the increased demand, which was frequently done in the past. Two or three furnace interests are reported to have gone out of the market for the rest of the year, having sold the product up to January 1. All pig iron sales so far are for delivery this year, but there are some inquiries for shipment in the first quarter of 1905. The demand for bessemer pig iron this week is light, but the sales for the past week aggregated from 15,000 to 20,000 tons. The buying was scattered among a number of different interests. Current prices are quoted for shipments throughout the year. The monthly report of J. G. Butler, chairman of the Bessemer Pig Iron Association, will not be completed before the end of the week. It will show a big improvement in the operation of the furnaces for September over the previous month. The most active of finished products is tin-plate. One independent interest in this district, operating a 10-mill plant, during the past week closed orders aggregating 45,000 boxes, deliveries on some extending into next year. The leading interest has booked a number of big contracts, but it does not make its business public, and information of increased trade is only known through the starting of additional plants. The company now has two idle plants—at New Kensington, in this district, known as the Pittsburg works, with 7 mills, and the Pennsylvania works, with 6 mills. Both are in the union list, and when operated are under the scale of the Amalgamated Association of Iron, Steel & Tin Workers. The employees at these works have withdrawn from the association, and the majority have signed a petition to the company asking that a start be made and agreeing to work under the scale paid at the Demmler works, a non-union plant. The company is considering the proposition, although President T. J. Shaffer, of the Amalgamated Association, declared that the company is bound to pay the union scale at those plants under the agreement signed, whether the men employed are members of the association or not. The company, however, does not seem to take that view of the matter. The price fixed by the leading interest several weeks ago—$3.30 a box—is said to have been shaded by independents in their anxiety to get business. It is said that while the big company quotes the price to all consumers, it has a system of rebates which makes the net rate considerably less. The sheet market is not particularly active, but some new business is being booked, and the independents are getting a fair share of the trade. Contracts calling for a large tonnage of structural material are likely to be placed in a short time, and will include about 10,000 tons for railroad work in the Pittsburg district. The Pennsylvania Railroad has just placed orders for 600 steel cars for the coal trade. The local union of the International Association of Bridge & Structural Iron Workers has given the Manufacturers' Association the required 90 days' notice of the termination of the wage agreement, which expires on December 31. The workers will insist on the termination of agreements on April 30, as heretofore, and have prepared a new contract, covering a period of 16 months from January 1. A strike may be ordered to enforce the demand. The wire market is fairly good, although there has not been much new business lately. In the western market the competition between the leading interest and the independents continues, and the trade is said to be about equally divided. The Inland Steel Co., with a large new plant at Indiana Harbor, near Chicago, is endeavoring to settle the trouble with its employees, who are members of the Amalgamated Association. The sheet workers have been on a strike for four months against a reduction in wages. The company has withdrawn the offer of a reduction and has asked for a conference, in order to get some concessions on the Amalgamated scale, on account of the introduction of improved machinery. President Shaffer has gone to confer with representatives of the company, and it is expected a satisfactory settlement will be reached. This will add another competitor to the already large number for the sheet trade. It is reported that pressure has been brought to bear on the Carnegie Steel Co. to end the trouble with the Amalgamated men in the hoop mills, and that another conference is to be held. It is known that United States Senator Charles Dick, of Ohio, has been asked to intercede for the workers, but the report that he has succeeded could not be confirmed at the office of the company.

Pig Iron.—Sales of foundry and forge iron during the past week are reported at about 25,000 tons, and fully 15,000 tons of bessemer iron have been sold. No sales have been made for delivery next year, but there are a number of inquiries for shipment in the first quarter. Prices quoted this week are as follows: Bessemer, $12, Valley furnace; foundry No. 2, $12.70@$12.85, Pittsburg; gray forge, $11.85@$12, Pittsburg.

Steel.—There has not been any heavy buying of billets, but the pool price of $19.50, Pittsburg, is being firmly maintained. It was reported during the week that an independent interest had taken an order at $17.50, and the report was extensively circulated, but was promptly denied by every steel billet maker in this district. Bessemer steel bars are firm, at 1.30c., and open-hearth at 1.35c. Plates range from 1.30 to 1.40c.

Sheets.—The market is not very active, although there is some business going. The cut in the price of sheet bars has not resulted in the lowering of prices for black sheets, and the minimum price for No. 28 gauge remains at 2.10c., and galvanized at 3.10@3.15c.

Ferro-Manganese.—The market is quiet, and 80% domestic is still quoted at $41.50 per ton.

Cartagena, Spain. Sept. 17.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Shipments for the week were two cargoes (3,000 tons) dry ore to Great Britain. Business is at a standstill. There are no sales for prompt shipment, owing to the high freight rates, while buyers seem to be holding back from covering future requirements, apparently waiting for a further fall in prices.

Quotations for iron ores are as follows, per ton, f.o.b. Cartagena. Ordinary 50% ore, 6s.@6s. 3d.; special low phosphorus, 6s. 6d.@7s. 3d.; specular ore, 58%, 8s. 6d.; magnetic ore, 60%, 10s. 9d. for lumps, and 9s. for smalls. For manganiferous ores, quotations vary from 9s. 3d. for 35% iron and 12% manganese, up to 14s. for 20% iron and 20% manganese.

Pyrite.—Iron pyrite, 40% iron and 43% sulphur, is quoted at 10s. per ton, f.o.b. Cartagena. Business is practically dead for the present.

CHEMICALS AND MINERALS.

New York, Oct. 5.

Manufactured products are in better demand, and prices generally are firmer. A large contract business over 1905 has been done in alum, on the basis of $1.75@$1.80 per 100 lb. for lump, $1.80@$1.85 for ground, and 90c. for paper stock.

Raw materials are firmer, brimstone gaining almost as much recognition as nitrate of soda. In August, Sicily exported 26,241 tons of brimstone, which makes 358,784 tons for the eight months, showing an increase of 27,071 tons as compared with last year. The shipments to the United States this year have been 65,175 tons best unmixed seconds and 15,474 tons thirds, making a total of 80,649 tons, as against 99,946 tons in 1903, recording a decrease of 19,297 tons, or nearly 20 per cent. Stocks in Sicily on August 31 were 320,753 tons, which compare with 323,455 tons in 1903, and 306,502 tons in 1902. Pyrite has been booked for next year's delivery on basis of quotations below. Phosphates continue strong.

The foreign trade of the United States in the eight months ending August 31 this year is shown below:

	Imports.	Re-exports.	Entered for consumption.
Asphalt, tons	70,090	1,567	68,523
Bleaching powd., lb.	58,220,051	1,434	58,218,617
Brimstone, tons	99,251	997	98,254
Cement, lb.	242,673,884	11,249,796	231,424,088
Chlorate potash, lb.	83,427	3,664	79,763
Clay or earths, tons.	130,519	142	130,377
Graphite, tons.	8,790	4	8,786
Nitrate of soda, tons	196,412	3,583	192,829
Phosphates, tons	65,481		65,481
Pyrite, tons.	242,903		243,903
Salt, lb.	216,949,458	1,211,974	215,737,484
Saltpeter, lb	8,437,741	789,650	7,648,091
Soda ash, lb.	12,002,963	23,498	11,979,465
Soda, caustic, lb	1,535,112	849,090	686,022
Soda, sal, lb	3,386,028	9,548	3,376,480

Exports of domestic products in the same period of this and last year were:

	1903.	1904.	Changes.
Cement, bbl.	153,855	350,779 I.	196,924
Copper, sulphate lb.	17,267,117	24,847,710 I.	7,580,593
Gunpowder, lb	513,749	337,647 D.	176,102
Lime, bbl.	37,301	45,636 I.	8,335
Lime acetate, lb	40,160,669	41,335,593 I.	1,174,924
Phosphates	519,275	569,623 I.	50,348
Salt, lb.	14,652,406	18,567,119 I.	3,914,713

Most of these exports were to Germany, the West Indies, Central and South America.

CURRENT PRICES.

Brimstone, Domestic 2ds, long ton, N. Y.	$21.20
Domestic 99.5% lg. ton, N. Y. (For Baltimore and Phila. add 25c.; Portland, 15c.)	21.50
Foreign 2ds, long ton, N. Y.	21.50
Foreign 3ds, long ton, N. Y.	20.75
Pyrite, Am. 42@44%, lump, unit, at shipping port.	10@10½c.
Am., fines, unit, at shipping port.	8½@9c.
Spanish, 46@52%, lump, unit, at N. Y.	10@12c.
Spanish, fines, unit, at N. Y.	9@10c.
Nitrate of soda, 95%, 100 lb	2.17½@2.22½
96%, 100 lb	2.20@2.25
Sulphate of ammonia, gas liquor, 100 lb	2.95@3.05
Phosphate, Fla. rock, 77@80%, f.o.b. shipping port	7.25@7.50
Fla. rock, 77@80%, c.i.f. Europe	10.53@11.70
Fla. land pebble, 68@73%, f.o.b. shipping port	3.75@4.00
Fla. land pebble, 68@73%, c.i.f. Europe	7.70@8.40
Tenn. 78@80%, f.o.b. Mt. Pleasant	4.00@4.25
Tenn., c.i.f. Europe	10.27@10.67
Tenn., 78%, f.o.b. Mt. Pleasant.	3.75@4.00
Tenn., 75%, f.o.b. Mt. Pleasant.	3.25@3.50
So. Car., land rock, f.o.b. Ashley River	3.25@3.50
So. Car., river rock, f.o.b. Ashley River	3.00@3.25
So. Car., river rock, c.i.f. Europe	6.33@6.56
Algerian, 63@70%, c.i.f. Europe	6.93@7.59
Algerian, 58@63%, c.i.f. Europe	6.15@6.60
Algerian, 53@58%, c.i.f. Europe	5.05@5.20
Tunis, c. i. f. Europe	6.33@6.50
Christmas isle, 80@85%, c.i.f. Europe	12.87@14.11
Ocean isle, 82@88%, c.i.f. Europe	13.60@14.45
Bleaching powder, prime, 100 lb	1.20@ 1.25
Cyanide, lb.	18@19c.
Copper sulphate, 100 lb	4.75@ 5.00
Nitric acid, 36°, 100 lb.	4.75
38°, 100 lb.	4.75
40°, 100 lb.	5.00
42°, 100 lb.	5.50
Oxalic acid, com'l, 100 lb	5.10@5.50
Sulphuric acid, 50°, bulk, ton	13.50@14.50
60°, 100 lb.	1.05
60°, bulk, ton	18.00@20.00
66°, 100 lb.	1.20
66°, bulk, ton	21.00@23.00

The above quotations are for wholesale quantities, f.o.b. New York, unless otherwise specified.

METAL MARKET

New York, Oct. 5.

Gold and Silver Exports and Imports.

At all United States Ports in August and Year.

Metal.	August.		Year.	
	1903.	1904.	1903.	1904.
Gold:				
Exports.	$84,776	$10,762,818	$40,538,775	$80,295,460
Imports.	7,848,553	7,761,371	26,455,814	64,450,515
Excess	I. $7,763,777	E. $3,001,447	E. 14,082,961	E$15,844,945
Silver:				
Exports.	3,019,655	4,848,932	22,540,420	35,751,145
Imports.	2,368,519	2,513,550	14,914,030	17,670,167
Excess	I. $348,864	E. $2,335,382	E. $7,626,390	E$18,080,978

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending October 1 and for years from January 1st.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week	$222,500	$245,931	$624,805	$35,439
1904	73,161,064	4,128,567	29,311,383	727,889
1903	31,402,005	6,514,385	23,167,886	2,950,425
1900	24,522,118	3,024,546	19,656,389	930,828

Gold exports were principally to the West Indies; of silver, chiefly to London.

Imports were $193,000 gold from France, while the balance, together with the silver, came mostly from Central America and the West Indies.

Business generally shows some improvement. Foreign exchange is lower, as cotton and grain bills come on the market, but no further movement toward importing gold is noted.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending October 1, gives the following totals, comparisons being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$912,903,100	$1,430,033,900
Deposits	897,214,400	1,212,797,100
Circulation	45,674,700	40,576,000
Specie	167,478,400	244,367,100
Legal tenders	70,762,700	78,745,600
Total reserve	$238,241,100	$323,112,700
Legal requirements	224,303,600	303,199,275
Balance surplus	$13,937,500	$19,913,425

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'n.	$167,478,400	.....	$244,367,100	.....
England	169,046,950	.....	194,606,815	.....
France	494,360,755	$223,205,665	528,763,915	$221,920,850
Germany	158,735,000	55,770,000	169,555,000	59,575,000
Spain	73,280,000	99,500,000	73,970,000	102,315,000
Netherlands	19,760,000	32,241,000	27,401,500	31,250,500
Belgium	14,553,335	7,276,665	16,366,665	8,183,335
Italy	97,880,000	11,916,000	109 990,000	16,651,500
Russia	408,010,000	39,420,000	479,125,000	40,560,000
Austria	230,180,000	62,890,000	243,785,000	61,575,000

The returns of the Associated Banks of New York are of date October 1, and the others September 29, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has continued firm, without special fluctuation or feature.

The United States Assay Office in New York reports receipts of 72,000 oz. of silver for the week.

Shipments of silver from London to the East for the year up to September 22 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£4,421,975	£7,505,498 I.	£3,083,523
China	294,186	372,722 I.	78,536
Straits	721,879	58,130 D.	663,749
Total	£5,438,040	£7,936,350 I.	£2,498,310

Receipts for the week were £93,000 in bar silver from New York, £12,000 from the West Indies and £17,000 from Australia; total, £122,000. Shipments were £40,910 in bar silver to Bombay and £2,500 to Madras; total, £43,410.

Indian exchange has been steady, and all the Councils bills offered in London were taken at 16d. per rupee. More gold is reported on the way from Australia to India. There has been somewhat better buying of silver for Indian account, and it is expected that the India Council will soon have to purchase silver for currency purposes.

The coinage executed at the mints of the United States in September is reported as below by the Bureau of the Mint, Treasury Department:

Denominations.	Pieces.	Value.
Double eagles	700,018	$14,000,360.00
Eagles	56,019	560,190.00
Half-eagles	16	80.00
Quarter eagles	19	47.50
Dollars, Lewis & Clark.	25,028	25,028.00
Total gold.	781,100	14,585,705.50
Dollars.	10	10.00
Half dollars.	912,085	456,042.50
Quarter dollars	2,868,085	717,021.25
Dimes.	2,790,085	279,008.50
Total silver	6,570,265	$1,452,082.25
Five c. nickels.	1,321,185	66,059.25
One c. bronze	8,687,185	86,871.85
Total minor.	10,008,370	$152,931.10
Total coinage	17,359,735	$16,190,718.85

In addition to the above there were coined 2,428,998 pieces for the Philippines and 250,000 pieces for Costa Rica.

The Treasury Department's estimate of the amounts and kinds of money in the United States October 1 is as follows:

	Total.	In Treasury.	In Circulation.
Gold Coin (inc. bullion in Treasury)	$1,351,455,968	$223,098,966	$641,844,863
Gold Certificates	.....	.....	486,512,139
Silver Dollars	558,851,02	14,710,902	76,000,250
Silver Certificates	.....	.....	468,139,876
Subsidiary Silver.	110,300,314	11,460,297	98,840,017
Treasury Notes of 1890	11,966,000	105,901	11,860,099
U. S. Notes	346,681,016	9,756,258	336,924,758
Currency Certif.	.....	.....	.....
Nat. Bank Notes	456,079,408	14,051,921	442,027,487
Total	$2,835,333,734	$273,184,245	$2,562,149,489

Population of the United States October 1, 1904, estimated at 82,214,000; circulation per capita, $31.16. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in National Bank Depositaries, to the credit of the Treasurer of the United States, and amounting to $104,256,226. The amount in circulation shows an increase of $3,869,505 over September 1; and an increase of $157,532,420 over October 1, 1903.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.46	$0.47½
Peruvian soles and Chilean pesos	.42	.43½
Victoria sovereigns	4.85	4.87
Twenty francs	3.87	3.90
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

Sept.-Oct.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. Per lb.	Spelter. St. Louis, Cts. per lb.
29	12¼@12¼	12¼@12¼	12¼@12¼	58	28½	4.20	5.05@5.07½	4.90@4.92½
30	" 12¼	" 12¼	" 12¼	57⅞	28½	4.20	" 5.05@5.07½	"4.90@4.92½
1	" 12¼	" 12¼	" 12¼	....	28½	4.20	" 5.05@5.07½	"4.90@4.92½
3	" 12¼	" 12¼	" 12¼	58½	@28½ 28¾	4.20	" 5.05@5.07½	"4.90@4.92½
4	" 12¼	" 12¼	" 12¼	58¾	28¾	4.20	" 5.05@5.10	"4.90@4.95
5	" 13	" 12¼	" 12¼	58¾	" 28¾	4.20	" 5.05@5.10	"4.90@4.95

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

Sept.-Oct.	Sterling Exchange.	Silver. New York. Cents.	Silver. London. Pence.	October	Sterling Exchange.	Silver. New York. Cents.	Silver. London. Pence.
29	4.85⅜	57⅞	26¼	3	4.85⅜	57⅞	26¼
	4.85⅜	57⅞	26⅛	4	4.85⅜	58	26⅛
1	4.85⅜	57⅞	26¼	5	4.85⅜	57⅞	26¼

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver .925 fine.

Copper.—The market continues to display considerable strength, and a large business has been done both for home trade and export. Consumption in Europe seems to be better than it has ever been known to be, while over here manufacturers also show more confidence, and orders are coming in quite satisfactorily. In well informed quarters the opinion is expressed that the production during this year will show only the usual normal increase. The closing quotations are given as 12¾@13c. for Lake Copper; 12⅝@12⅞ for electrolytic in ingots, cakes and wirebars, 12⅜@12⅝ in cathodes; 12⅜@12½ for casting copper.

The market for standard copper in London, which closed last week at £57 17s. 6d., opened on Monday at £58 2s. 6d., and the closing quotations on Wednesday are cabled as £58 16s. 3d.@£58 17s. 6d. for spot, £58 17s. 6d.@£58 18s. 9d. for three months.

Statistics for the second half of September show an increase in the visible supplies of 1,000 tons.

Exports for the month of September amounted to about 22,500 tons.

Refined and manufactured sorts we quote: English tough, £61@£61 5s.; best selected, £62 @£62 5s.; strong sheets, £70 10s.@£71; India sheets, £68 10s.@£69 yellow metal, 6¼@6⅜d.

Exports of copper from New York and Baltimore for the week ending October 4 were 5,464 long tons, principally to France, Austria, Germany, Denmark and Great Britain. Imports for the week of September 30 were 52 tons copper.

Imports of copper and copper material into the United States for the eight months ending August 31, with re-exports of foreign material, are reported as below by the Bureau of Statistics of the Department of Commerce and Labor, the figures given being in long tons, of 2,240 pounds:

Fine copper:	1903.	1904.	Changes.
Imports	39,721	42,749 I.	3,028
Re-exports	920	350 D.	570
Net imports	38,801	42,399 I.	3,598
Ores and matte:			
Imports	171,682	163,636 D.	8,046
Re-exports	4,573	D.	4,573
Net imports	167,109	163,636 D.	3,473

The copper contents of the ores and matte imported this year are given at 10,058 tons. This makes the total net imports of copper this year equal to 52,457 tons. Last year the copper contents of ores and matte were not reported.

Of the imports this year, Mexico furnished 29,933 tons of fine copper and 40,691 tons of ore and matte, containing 4,771 tons of copper —34,704 tons of metal in all. Canada sent 4,823 tons of copper and 113,904 tons of ore and matte, containing 4,411 tons of copper— 9,234 tons of metal in all. There were 5,441 tons of copper imported from Great Britain.

Exports of copper in all forms from the United States, not including the re-exports of foreign metal given above, are reported as follows, also in long tons:

	1903.	1904.	Changes.
Fine copper	82,082	156,823 I.	74,741
Ores and matte	8,293	11,767 I.	3,474

The increase in exports of fine copper this year was 91.1%. The contents of the ores exported are not given; estimating them chiefly on the basis of values, we find that our total exports this year were equal to 160,219 tons of fine copper. The exports thus exceeded the net imports by 107,762 tons this year.

Tin has ruled very firm indeed throughout the week. Cables received from abroad indicate that spot tin is rather scarce, although the statistics for the month of September show an increase in the visible supplies of 1,800 tons.

The foreign market, which closed last week at £127 2s. 6d., opened on Monday at £128 2s. 6d., advanced on Tuesday to £128 15s., and the closing quotations on Wednesday are cabled as £129 2s. 6d.@£129 5s. for spot, £129@£129 2s. 6d. for three months.

Our market here followed closely the ups and downs of that in London. While last week it ruled rather quiet, a somewhat firmer tendency developed during the first half of this week, stimulated by the strong advices received from abroad. The closing quotations are given as 28⅜@28½ for spot and futures.

Imports of tin into the United States for the eight months ending August 31 are reported as follows, the figures being in long tons, of 2,240 pounds:

	1903.	1904.	Changes.
Straits	15,199	12,693 D.	2,506
Australia	186	232 I.	46
Great Britain	10,066	13,393 I.	3,327
Holland	801	435 D.	366
Other Europe	324	270 D.	54
Other countries	.....	22 I.	22
Totals	26,576	27,045 I.	469

The larger part of the imports credited to Great Britain is Straits tin, which comes here through British ports.

Lead continues quiet but firm, without any special feature. The closing quotations are given as 4.20 New York, 4.12½ St. Louis.

The foreign market is very strong and advancing, Spanish lead being quoted at £12, English lead £12 2s. 6d.

Imports of lead into the United States for the eight months ending August 31, with re-exports of foreign lead, are reported as follows, in short tons of 2,000 lb.:

	1903.	1904.	Changes.
Lead, metallic	688	6,279 I.	5,591
Lead in ores and base bullion	71,198	70,664 D.	534
Total imports	71,886	76,943 I.	5,057
Re-exports	55,119	59,757 I.	4,638
Net imports	16,767	17,186 I.	419

Of the imports this year, 70,462 tons were from Mexico and 5,706 from Canada. In addition to the re-exports given above, there were 52 tons of domestic lead exported in 1903, and 33 tons in 1904; a decrease of 19 tons.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of September 17, that the price of silver during the week has been 14.50 reales per oz. Exchange is 34.73 pesetas to £1. Local quotation for pig lead has been 65.50 reales per quintal, which, on current exchange, is equal to £10 14s. 5d. per long ton, f. o. b. Cartagena. Exports were 29,999 kg. antimonial lead to Hamburg.

Spelter.—Owing to the disparity between the values ruling for ore and the prices which can be realized for spelter, producers have become rather reluctant sellers. There is a good consumptive demand. The closing quotations are given as 4.90@4.95 St. Louis, 5.05@ 5.07½ New York.

The foreign market is strong and advancing, good ordinaries being quoted at £22 15s., specials £23.

Exports of spelter from the United States in August were large, amounting to 1,261 tons. For the eight months ending August 31 the exports were 1,171 short tons in 1903, and 3,231 tons in 1904; an increase of 2,060 tons. Exports of zinc ore for the eight months were 23,740 tons in 1903, and 18,325 tons in 1904; a decrease of 5,415 tons this year.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of September 17, that the demand for zinc ores continues good. Quotations are unchanged at 67 pesetas per ton for blende, 35% zinc, and 47 pesetas for calamine, 30% zinc. Shipments for the week were 350 tons of blende to Swansea and 3,100 tons blende to Antwerp.

Antimony is dull and neglected. We quote: Cookson's, 6¾@7c.; Hallett's, 6⅜@6⅝; U. S., French, Hungarian, Japanese, Italian and Chinese, 5⅞@6c.

Imports of antimony into the United States for the eight months ending August 31 are reported as follows, in pounds:

	1903.	1904.	Changes.
Metal and regulus	4,072,267	2,506,076 D.	1,566,191
Antimony ore	2,010,438	1,501,450 D.	508,988

This shows decreases of 38.5% in metal and regulus, and of 25.3% in ore imported.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Exports of nickel, nickel oxide and nickel matte from the United States for the eight months ending August 31 were 1,619,743 lb., in 1903, and 3,391,447 lb., in 1904; showing an increase of 1,771,704 lb. This year's exports have been more than double those of 1903. Imports of nickel ore and matte in 1904 were 5,652 tons; last year these imports were not reported separately.

Platinum.—Quotations are higher at $19.50.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Imports of platinum into the United States for the eight months ending August 31 were 6,166 lb. in 1903, and 4,936 lb. in 1904, showing a decrease of 1,230 lb. this year.

Quicksilver.—Prices are low. In New York large lots have been offered at $40 per flask (75 lb.), with $41@$42 quoted for smaller orders. The San Francisco price is now $41.50 @$42. London price is £7 15s., with the same quotation from second-hands.

Exports of quicksilver from the United States for the eight months ending August 31 were 848,723 lb. in 1903, and 1,177,545 lb. in 1904, an increase of 328,822 lb. this year.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg. at Breslau, Germany. Manganese metal is quoted at 360 marks per 100 kg., f. o. b. Bremen, Germany. Manganese tin alloy, 55%, is quoted 365 marks per 100 kg. for first quality and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals and their alloys, wholesale prices, f. o. b. works, are as follows:

	Per lb.		Per lb.
Aluminum.			
No. 1, 99% ingots	33@37c	Perro-Chrom. (74%)	12½c.
No. 2, 99% ingots	31@34c	Perro-Tungsten (37%)	45c.
Rolled Sheets	4c. up	Magnesium, pure	
Alum-bronze	20@23c.	(N.Y.)	$1.60
Nickel-alum	33@39c.	Manganese, (98@99%	
Bismuth	$2.10	N. Y.)	75c.
Chr'm'm, pure (N.Y.)	80c.	Manganese, Cu., (30@70%	
Copper, red oxide	50c.	N. Y.)	40c.
Fe.-Molybd'm (50%)	$1.00	Molybdenum, (98@99%	
Ferro-Titanium (20@25%		N. Y.)	$2.75
N. Y.)	75c.	Phosphorus, foreign	45c.
Ferro-Vanadium, (25%		Phosphorus, American	70c.
N. Y.)	$3.00	Sodium metal	50c.
		Tungsten (best)	$1.25

Differences in price depend chiefly upon size and conditions of order.

Missouri Ore Market. Oct. 1.

(From Our Special Correspondent.)

The highest price reported paid for zinc ore was $52.50 per ton, an advance in price, since the restriction of the output was begun in July, of $15.50 per ton. There are just two things there is no apparent question about in the ore situation—the scarcity of zinc ore and the need of zinc ore. That is the only possible and plausible excuse for the smeltermen paying more for ore than they can sell the metal for, and they are paying $11 at least more than the metal will net them at present prices. Of course, they expect to receive and must have a higher price than now, or some one will go out of business. Lead ore is unchanged at $53.50 per ton.

Following are the shipments from the various camps of the Joplin district for the week:

	Zinc lb.	Lead lb.	Value.
Carterville-Webb City	2,356,500	515,300	$63,140
Joplin	2,200,280	304,450	59,850
Duenweg	949,390	128,780	26,210
Galena-Empire	818,000	171,840	21,820
Alba-Neck	755,280	19,220	18,650
Granby	602,400	171,000	12,480
Aurora	533,100	9,920	10,500
Carthage	329,530	.....	7,590
Badger	318,660	8,110	7,550
Oronogo	311,330	5,660	6,920
Prosperity	237,220	29,950	6,010
Zincite	218,500	15,510	5,210
Baxter Springs	59,570	36,450	1,900
Beef Branch	86,300	17,270	1,630
Diamond	64,930	.....	1,500
Sherwood-Mitchell	42,630	14,770	1,200
Wentworth	40,300	.....	880
Totals this week,	9,923,920	1,448,260	$253,040
40 weeks	396,643,410	50,150,820	$8,078,280
Zinc value, the week,	$215,080;	40 weeks,	6,715,870
Lead value, the week,	37,960;	40 weeks	1,362,410

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan ...	28.33	28.845	4.075	4.347	4.865	4.863
Feb ...	29.43	28.087	4.075	4.375	5.043	4.916
Mar. ..	30.15	28.317	4.442	4.475	5.349	5.057
April ..	29.81	28.132	4.567	4.475	5.550	5.219
May ...	29.51	27.718	4.325	4.423	5.639	5.031
June ..	28.34	26.325	4.210	4.196	5.697	4.760
July ...	27.68	26.573	4.075	4.192	5.662	4.873
Aug. ..	28.29	27.012	4.075	4.111	5.725	4.866
Sept ..	26.77	27.780	4.243	4.200	5.686	5.046
Oct ...	25.92	.....	4.375	.....	5.510	.....
Nov. ..	25.42	.....	4.218	.....	5.038	.....
Dec ...	27.41	.....	4.162	.....	4.731	.....
Year...	28.09	.....	4.237	.....	5.400	.....

Note.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5.038c.; May, 4.853c.; June, 4.596c.; July, 4.723c.; August, 4.716c; September, 4.896c

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan ..	12.159	12.410	12.361	12.553	53.52	57.55
Feb. .	12.778	12.063	12.901	12.245	57.34	56.57
Mar. .	14.416	12.299	14.572	12.551	63.85	57.321
April .	14.454	12.923	14.642	13.120	61.72	58.247
May..	14.435	12.758	14.618	13.000	61.73	57.321
June .	13.942	12.269	14.212	12.399	57.30	56.398
July..	13.094	12.380	13.341	12.505	56.64	57.256
Aug. .	12.962	12.343	13.159	12.468	58.44	56.952
Sept .	13.205	12.495	13.345	12.620	56 82	57.645
Oct ..	12.801	.....	12.954	.....	55.60	.....
Nov. .	12,617	.....	12.813	.....	56.30	.....
Dec ..	11,952	.....	12,084	.....	56.36	.....
Year..	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pound sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London, Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan ...	25.62	55.56	21.98	47.57	26.423	57.055
Feb ...	25.41	55.09	22.11	47.89	26.665	57.592
Mar. ..	25.00	54.23	22.49	48.72	26.164	56.741
April..	24.34	52.72	23.38	50.56	24.974	54.202
May...	23.71	51.31	24.89	54.11	25.578	55.430
June ..	24.17	52.36	24.29	52.86	25.644	55.673
July...	24.38	52.88	24.86	53.92	26.760	58.095
Aug. ..	24.23	52.52	25.63	55.36	26.591	57.806
Sept ..	23.88	51.52	26.75	58.00	26.349	57.120
Oct ...	23.40	50.57	27.89	60.36	.....	.....
Nov. ..	22.70	49.07	27.01	58.11	.....	.....
Dec ...	22.21	48.03	25.73	55.375	.....	.....
Year...	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company.	Latest Dividend. Payable.	Rate.	Total.
†Am. Sm. & Ref., com	Oct. 25	$1.25	$625,000
†Am. Sm. & Ref., pf.	Oct. 11	1.75	875,000
*Bunker Hill & Sull	Oct. 4	.25	75,000
†Central C. & C., com.	Oct. 15	1.50	76,875
†Central C. & C., pf.	Oct. 15	1.25	23,437
*Daly-West, Utah	Oct. 15	.40	72,000
*Dos Estrellas, Mex	Oct. 15	4.60	13,800
*Four Oil, Cal	Oct. 15	.01	2,087
Greene Con. Copper	Oct. 28	.30	259,200
†Guggenheim Expl.	Oct. 11	1.75	183,750
*Imperial Oil, Cal.	Oct. 6	.20	20,000
Iron Silver, Colo	Oct. 31	.10	50,000
*Monte Cristo Oil	Oct. 10	.01	5,000
*Natividad, Mex.	Oct. 15	5.00	12,000
*Pa. Con., Cal	Oct. 13	.10	5,150
‡Pa. Salt	Oct. 15	3.00	180,000
†Phila. Nat. Gas., com	Nov. 1	.75	398,888
*Silver King, Utah	Oct. 10	.66⅔	100,000
†Va. Car Chem., pf.	Oct. 15	2.00	360,000

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Company.	Delinq.	Sale.	Amt.
Alpha Con., Nev.	Oct. 3	Oct. 24	.05
California, Utah	Oct. 12	.....	.06
Con. Cal. & Va.	Oct. 31	Nov. 21	.25
Confidence, Nev	Sept. 19	Oct. 7	.20
Con. St. Gothard	Oct. 15	.....	.05
Humboldt, Cal	Oct. 8	.....	.01
Marina Marsicano.	Sept. 29	Oct. 31	.05
Mohican, Cal.	Oct. 15	.....	.10
Orleans Con., Cal.	Sept. 15	Oct. 31	.07
Savage, Nev	Oct. 5	Oct. 26	.10
Tule Belle, Cal.	Nov. 1	.....	.02
White Pine, Nev.	Oct. 21	.....	.20
Ybarra, L. Cal.	Oct. 29	.....	.05
Yellow Jacket, Nev.	Sept. 22	Oct. 27	.10

NEW YORK.

Company.	Par val.	Sept. 28 H.	Sept. 28 L.	Sept. 29 H.	Sept. 29 L.	Sept. 30 H.	Sept. 30 L.	Oct. 1 H.	Oct. 1 L.	Oct. 3 H.	Oct. 3 L.	Oct. 4 H.	Oct. 4 L.	Sales.
Amalgamated, C.	100	59	58½	58½	58	58½	58	58¾	58½	59½	58½	...	...	.....
Anaconda	25	94	92½	90½	...	...	...	...	...	...	...	...	...	.....
Belcher	1	...	...	...	...	...	...	...	...	...	...	...	...	.....
Best & Belcher.	3	...	...	...	...	...	...	...	...	...	...	...	...	.....
Brunswick	5	11	...	...	...	...	...	...	...	...	...	...	...	.....
Caledonia	1	...	...	...	...	60	...	...	...	...	...	...	...	.....
Challenge	1	20	...	...	...	23	...	...	...	...	...	...	...	.....
Chrysolite	50	05	...	05	...	...	...	...	...	...	...	...	...	.....
Con. Cal. & Va	2½	...	...	...	...	150	...	135	...	160	...	...	...	.....
Con. Imperial	1	01½	...	...	...	...	...	...	...	...	...	...	...	.....
Creede & C. Ck.	1	...	...	02	...	...	...	...	...	...	...	...	...	.....
Cripple Creek Con.	1	...	...	...	...	...	...	...	...	...	...	...	...	.....
Elkton Con	1	61	...	62	...	...	...	...	...	.61	...	...	...	.....
El Paso	1	...	...	...	...	...	...	...	...	...	...	...	...	.....
Gold Dollar	1	06	05	...	...	...	...	...	...	...	...	...	...	.....
Greene Con.	10	18½	18½	18½	18½	18½	18½	18½	17	19½	18½	...	...	.....
Hale & Norcross	3	65	64	...	...	...	...	...	...	...	...	...	...	.....
Homestake	100	...	...	...	...	...	...	...	...	...	...	...	...	.....
Isabella	1	19	...	...	...	...	...	18	...	19	...	...	...	.....
Jack Pot	1	...	...	...	...	...	...	...	...	...	...	...	...	.....
Leadville	10	...	...	03	...	...	...	...	...	...	...	...	...	.....
Little Chief	50	...	...	06	...	...	...	...	...	...	...	...	...	.....
Mexican	3	...	...	130	125	...	...	...	...	...	...	...	...	.....
Mollie Gibson	5	...	...	...	...	05	...	...	...	...	...	...	...	.....
Moon Anchor	5	07	...	...	...	08	07	...	...	...	...	...	...	.....
Moulton	25	18	...	...	...	...	...	...	...	...	...	...	...	.....
Old Gold	1	...	...	...	...	10	...	...	...	...	...	...	...	.....
Ontario	100	...	...	...	...	...	...	...	...	400	390	...	...	.....
Ophir	3	...	...	250	...	...	...	235	230	250	...	...	...	.....
Overman	1	...	...	...	...	...	...	...	...	...	...	...	...	.....
Pharmacist	1	03	...	...	...	...	...	...	...	04	...	...	...	.....
Phœnix	1	18	15	18	15	17	15	...	...	15	...	...	...	.....
Portland	1	...	...	...	...	160	...	...	...	160	...	...	...	.....
Potosi	1	19	18	...	...	17	...	...	...	18	...	...	...	.....
Quicksilver pf.	100	...	...	...	...	...	...	...	...	375	...	...	...	.....
Savage	3	...	...	33	...	34	...	...	...	35	...	...	...	.....
Sierra Nevada	3	34	33	...	...	...	...	...	...	42	41	...	...	.....
Small Hopes	20	...	...	35	...	...	...	...	...	...	...	...	...	.....
Standard Con.	10	...	...	...	...	...	...	...	...	210	...	...	...	.....
Tennessee C.	10	...	...	...	...	...	...	...	...	...	...	...	...	.....
Union Con	1	...	...	...	...	46	45	45	...	52	51	...	...	.....
Union Copper	25	...	...	1⅛	...	...	...	...	...	...	...	...	...	.....
United Copper	100	...	...	...	...	...	...	...	...	6	...	...	...	.....
White Knob	10	3	2½	2½	2½	3	2	2	1½	1½	1½	...	...	.....
Work	1	...	...	...	...	08	...	08	...	08	...	...	...	.....
Yellow Jacket	1	...	...	...	...	27	...	...	...	...	...	...	...	.....

SALT LAKE CITY.*

Sept. 24

Company.	Par Val	High.	Low.	Sales.	Company.	Par Val	High.	Low.	Sales.
Butler-Liberal	$	.09½	$ .09½	1,500	May Day	$25	.07½	.05½	48,145
Carisa	$ 1	.10½	.09½	1,500	N. Y. Bonanza	1	.03	.02	13,900
Century	...	.40	.39	200	Ontario	...	3.90	3.90	25
Columbus Con.	...	1.33	1.15½	2,900	Sacramento	5	.14½	.13½	11,200
Con. Mercur	...	.31	.31	1,000	Silver Shield	...	.04½	.04	13,000
Daly	...	2.25	2.25	100	Star Con.	1	.14½	.14	3,300
Dalv-Judge	1	4.40	4.40	100	Tetro	1	.26½	.26½	1,500
Daly West	20	14.25	14.00	155	Uncle Sam Con.	1	.23	.19½	6,600
Grand Central	1	4.00	3.85	350	Victoria	...	1.10	1.10	500
Little Chief	...	.01½	.01	19,000	Victor Con.	1	.01	.01½	900

*By our Special Correspondent. Total sales, 125,875 shares.

BOSTON, MASS.

Company.	Par val.	Sept. 28 H.	Sept. 28 L.	Sept. 29 H.	Sept. 29 L.	Sept. 30 H.	Sept. 30 L.	Oct. 1 H.	Oct. 1 L.	Oct. 3 H.	Oct. 3 L.	Oct. 4 H.	Oct. 4 L.	Sales.
Adventure Con.	$25	4½	3½	4½	3½	4	3½	...	...	4	3½	4	...	3,070
†Allouez	25	15½	14	14½	14	14½	14½	14½	14½	14½	12½	14½	12½	10,288
Amalgamated	100	58½	58½	58½	58	58½	58½	58½	58½	59½	58½	60	59½	16,290
Anaconda	25	...	...	23½	...	...	...	...	...	...	...	...	...	10
Arcadian	25	...	...	...	...	...	...	...	...	...	...	...	...	.....
Arnold	25	...	...	...	...	...	...	...	...	...	...	25	...	100
Atlantic	25	13½	...	13	12½	12½	12⅝	13½	13½	13½	13½	13½	13	835
Bingham Con.	50	26½	26½	...	...	26½	26½	...	...	26½	26⅝	27	26½	1,221
Bonanza	10	47½	...	...	...	...	...	...	...	...	...	50	...	250
Boston Con.	5	6½	...	6⅝	6½	6⅝	6⅝	6⅝	...	6⅝	...	6⅝	6½	2,600
Calumet & Hecla	25	520	515	520	517	519	...	515	...	...	...	520	515	75
Centennial	25	...	...	27½	26½	27½	27	27½	27½	27½	27	27½	27	1,035
Central Oil	25	...	...	...	...	...	...	...	...	...	...	...	...	.....
Con. Mercur	5	.30	...	...	...	...	...	...	...	.32	.30	...	...	350
Copper Range	100	57½	56½	57	56½	57½	56½	57½	57	57⅛	56⅝	57½	57	3,816
Daly-West	20	14½	...	14½	14	14	...	14	...	14½	14	14	13½	941
Elm River	12	...	...	...	...	...	...	...	...	...	...	...	...	.....
Franklin	25	8½	...	8	...	7½	...	...	...	8	...	...	...	160
Granby Con.	10	3½	3½	3½	3½	4	3½	4	3½	4	3½	4	3½	53,561
Guanajuato Con.	5	1½	...	1½	...	...	...	...	...	1⅛	...	1½	...	140
Isle Royal Con.	25	22½	20½	21	20½	21½	20½	21½	21	21½	20½	21	20½	3,596
Mass Con	25	4½	...	4½	...	...	...	4½	...	4½	4½	4½	...	380
Mayflower	25	...	...	50	...	...	...	...	...	...	...	...	...	100
Michigan	25	6½	...	6½	6	7⅛	6½	7⅛	7	7⅛	7⅛	7⅛	...	2,945
Mohawk	25	46½	...	46	45½	47	45½	48	47	48	47½	48	...	2,828
Mont. Coal & C	25	5	...	...	...	...	...	...	...	...	...	...	...	100
Mont. & Boston	5	...	...	...	...	...	...	...	...	...	...	...	...	.....
New Idria	5	...	...	...	...	10	...	...	...	...	...	...	...	10
Old Colony	25	...	...	...	...	...	...	...	...	...	...	...	...	.....
Old Dominion	25	17½	17	17½	17	18½	17½	18½	18	19⅛	18½	19⅛	19½	6,785
Osceola	25	81½	81	81	80	82	81	82⅛	82	82½	82	82½	81	2,695
Parrot	10	24	...	...	...	...	24	23½	24	...	...	...	...	230
Phœnix Con.	25	...	...	2⅛	...	2½	2⅛	2½	...	2½	2⅛	...	...	460
Quincy	25	91	...	...	...	91½	...	91½	...	92	...	90	...	141
Rhode Island	25	1⅛	1	1⅛	...	1⅛	...	...	...	...	...	...	...	530
Santa Fe	10	1⅛	...	...	...	...	...	...	...	1⅛	1⅛	1⅛	1⅛	550
Shannon	10	4½	4	4½	4	4½	3⅞	4	...	4½	4⅜	5	4½	13,180
Tamarack	25	117	...	117	115	115	...	118	...	115	...	119	116	298
Trinity	25	8½	7⅞	7⅞	7½	7⅞	7½	7⅞	7⅞	8½	7⅞	8½	7⅞	6,620
United States	10	21½	20⅝	21½	20½	21	20½	21½	21	21½	21½	21½	21½	7,067
U.S.Coal & Oil	25	11½	11	11	...	11½	...	11½	...	11½	10⅜	11½	11	740
Utah Con	5	41	40	40⅜	39⅜	41⅜	40½	41½	41	41½	41	41½	41	6,606
Victoria	25	4½	...	4½	4	4⅜	4	4⅜	4	4½	...	4½	...	1,235
Winona	25	...	...	8½	...	9	8½	...	...	9	8½	8½	...	205
Wolverine	25	90	89½	89½	...	90	...	90	...	90	89	89½	...	496
Wyandot	25	1.00	.75	1.00	.90	.98	.95	1.00	.99	1½	1	1½	1	6,720

*Ex-dividend. †Assessment paid. Total sales, 159,266 shares.

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	Sept. 28 H.	Sept. 28 L.	Sept. 29 H.	Sept. 29 L.	Sept. 30 H.	Sept. 30 L.	Oct. 1 H.	Oct. 1 L.	Oct. 3 H.	Oct. 3 L.	Oct. 4 H.	Oct. 4 L.	Sales.
Allis-Chalmers	$100	...	...	...	...	...	...	...	...	11½	...	...	...	100
Allis-Chalmers pf.	100	...	...	...	...	50	...	...	...	...	...	50	...	200
Am. Agr.Chem.pf.	100	...	...	...	...	...	...	...	...	...	...	...	...	.....
Am. Sm. & Ref.	100	67½	67	66½	66⅜	66½	66½	67	66½	67½	66½	67½	66½	13,038
Preferred	100	109½	109½	110	109½	‡108½	108	108	107½	108	...	108	...	3,520
Cambria Iron	50	...	...	...	...	46½	...	...	...	47	46½	47	...	1,407
Cambria Steel	50	22½	22½	23	22½	22½	22½	22½	22½	23½	22½	23½	23½	10,093
Col. Fuel & Iron.	100	35½	34½	35½	34½	35	34½	36½	34½	37	35½	37	35½	9,605
Col. & H. C. & I.	100	12½	...	12½	...	...	...	...	...	12½	12½	13	12½	1,100
†Lehigh C. & N.	50	88½	86	89½	88	89½	88½	88½	88	89	88½	89	88½	5,580
*Mong. R. Coal pf.	50	22	20½	22	...	22	...	22	...	...	...	24	23½	665
National Lead	100	24½	24½	24½	23½	24½	...	24½	...	26½	24½	26	25½	25,600
Preferred	100	96½	...	...	...	96½	...	...	...	97½	96½	97½	...	1,200
†Phila. Nat. Gas.	50	43½	43	43½	42½	43½	42½	42½	42½	42½	42	43	42	7,073
Preferred	50	45½	...	...	...	45	...	...	...	45	...	...	...	253
*Pittsburg Coal	100	...	...	13½	13½	...	...	...	...	14	13½	16	15½	2,005
Preferred	100	61½	61	61½	61¼	61½	61	62½	61½	64½	62½	68½	67	4,717
Republic I. & S	100	9½	9	9	8½	9½	8½	10½	9½	11	10½	11½	10½	32,285
Preferred	100	45½	44½	45½	45	46½	45	51	47	52⅜	50½	53½	52½	25,620
Sloss-Shef. S. & I	100	40½	...	40	...	...	...	...	...	42	41	42½	42	1,600
Preferred	100	...	...	...	...	88½	...	...	...	...	...	90	...	120
Standard Oil	100	642	640½	...	...	645	640½	643	642	645	644½	645	644	112
Tenn. C. I. & R.R.	100	48½	47½	48½	47½	48½	47½	49	48½	49½	48½	49½	49½	26,710
U. S. Steel Corp	100	18½	17½	18½	17½	18½	17½	18½	18½	19½	18½	19⅜	18½	291,805
Preferred	100	72½	70½	73	71½	74½	71½	75	73½	76½	73½	76½	75	717,817
Va.-Car Chem.	100	35½	35½	35½	34½	...	...	35	...	35½	...	35	34½	2,651
Preferred	100	108½	108	108½	107½	‡106½	106½	106½	106	107½	106½	107½	106½	6,090
†Westmoreland C.	50	...	...	...	...	...	...	...	...	...	...	...	...	.....

*Pittsburg Exchange; †Philadelphia Exchange; all others, New York Stock Exchange. Total sales, 1,194,966 shares. ‡Ex-dividend.

STOCK QUOTATIONS.

SAN FRANCISCO.*

Company.	Location.	Sept. 22 H.	Sept. 22 L.	Sept. 23 H.	Sept. 23 L.	Sept. 24 H.	Sept. 24 L.	Sept. 26 H.	Sept. 26 L.	Sept. 27 H.	Sept. 27 L.	Sept. 28 H.	Sept. 28 L.	Sales.
MacNamara	Nev	.37	.35	.36	....	.40	.37	.40	.37	.40	.37	.40	.38	27,129
Mont. Tonopah	Nev	1.95	1.85	1.85	1.80½	1.85	....	1.85	....	1.90	....	1.92½	1.90	6,200
Ton. Belmont	Nev	.56	....	.56	.55	....	....	.57	.56	.57	....	....	....	5,600
Ton. Midway	Nev	.37	....	.39	.37	.37	.36	.40	.37	.39	....	.38	....	10,300
Ton. Mg. Co	Nev	....	....	8.00	....	8.12½	....	....	....	8.25	8.12½	8.50	8.25	1,825
Ton. North Star	Nev	....	....	....	....	....	....	....	....	.25	....	....	....	1,000

*San Francisco & Tonopah Exchange. Total sales, 52,054 shares.

SAN FRANCISCO (By Telegraph.)

Company.	October. 3	October. 4	Company.	October. 3	October. 4
Belcher	$0.34	$0.37	Gould & Curry	$0.24	$0.26
Best & Belcher	1.30	1.30	Hale & Norcross	.62	.62
Caledonia	.62	.62	Mexican	1.30	1.45
Challenge Con.	.22	.25	Ophir	2.45	2.70
Chollar	.20	.24	Overman	.22	.21
Confidence	1.00	1.00	Sierra Nevada	.45	.50
Con. California & Virginia	1.65	2.20	Union Con	.54	.59
Crown Point	.15	.16	Yellow Jacket	.25	.25

COLORADO SPRINGS (By Telegraph.)

Company.	Oct. 3 H.	Oct. 3 L.	Oct. 4 H.	Oct. 4 L.	Company.	Oct. 3 H.	Oct. 3 L.	Oct. 4 H.	Oct. 4 L.
Anaconda	11½	10	....	....	Jack Pot	05	03½	05	04
C. K. & N.	20	....	25	20	Last Dollar	25	....	25	....
Cripple Ck. Con.	09½	08½	09	08¾	Mollie Gibson	04½	03	04½	....
Doctor Jack Pot	04½	04¾	....	....	Moon Anchor	07½	06¾	07½	07
Elkton Con	62½	61	62¾	62½	Old Gold	10	09½	10½	09¾
El Paso	105	100	104½	104	Pharmacist	03¾	03¾	03¾	03½
Gold Dollar	06¾	06½	06¾	06¾	Portland	170	165	167½	165
Gold Sovereign	06	05½	....	....	Vindicator Con	68	62	68	62
Isabella	20	19	19¾	19½	Work	08¾	08½	....	....

ST. LOUIS, MO.* Oct. 1

Company.	Par Val.	Bid.	Ask.	Company.	Par Val.	Bid.	Ask.
Am. Nettie, Colo	$10	$0.17	$0.25	Columbia Lead, Mo.	$10	$0.25	$1.00
Catherine Lead, Mo	10	.50	1.00	Con. Coal, Ill	100	14.00	15.50
Central Coal & C.	100	63.25	65.00	Doe Run Lead, Mo.	100	110.00	115.00
Central C. & C., Pf	100	71.30	72.00	Granite Bimet., Mt.	10	.30	.42
Central Lead, Mo.	100	110.00	117.00	St. Joe Lead, Mo	10	14.00	14.75

*By our Special Correspondent.

DULUTH, MINN. Sept. 24.

Company.	Par Val.	Bid.	Ask.	Company.	Par Val.	Bid.	Ask.
Calumet & Arizona	$10	$95.00	$98.00	Lake Sup. & Pitts	$10	$45.00	$45.50
Calumet & Bisbee	10	....	2.00	Pitts. & Duluth Dev	15	58.00	60.00
Calumet & Pittsburg	10	38.00	39.50	Shakespeare	1	....	.20
Higgins Development	10	....	1.00	United Mexican	10	....	.50
Junction Development	15	35.00	35.50	Wolverine & Arizona	10		2.00

MONTREAL.* Sept. 30.

Company.	Par Val	High	Low	Sales	Company.	Par Val	High	Low	Sales
Dominion Coal	100	58.50	58.00	455	Montreal Steel	100	40.00	35.00	....
Dom. Coal, Pf	100	110.00	....	22	Mont'l Steel, Pf	100	90.00	85.00	....
Dom. I. & St	100	12.50	11.87½	1,400	Nova Scotia St	100	68.87½	65.00	1,190
Dom. I. & St., Pf	100	40.25	38.00	760	N. S. Steel, Pf	100	105.00	....	70

*Montreal Stock Exchange. Total sales, 3,897 shares.

MEXICO. Sept. 23

Company.	Shares Issued	Prices, Mex. Bid.	Prices, Mex. Ask.	Company.	Shares Issued	Prices, Mex. Bid.	Prices, Mex. Ask.
DURANGO:				Soledad, aviada	$670	$960	$1,000
Ca. Min. de Penoles	2,500	$2,700	$3,200	Sorpresa, aviada	960	300	305
San Andres de la Sierra	200	10,000	....	MEXICO:			
GUANAJUATO:				Aldebarren	2,000	58	60
Cinco Senores y An. aviadoras	2,000	33	35	Buen Despacho	3,000	58	64
Cinco, Senores y An. aviada	400	33	38	Dos Estrellas	3,000	2,150	2,200
Providencia, San Juan de la Luz	6,000	55	58	La Esperanza (El Oro.)	3,000	1,500	1,500
GUERRERO:				Santa Ana, Esperanza	2,400	15	30
Garduno y Anexas	7,200	35	40	NUEVO LEON:			
HIDALGO:				La Fraternal	1,000	580	620
Amistad y Con.	9,600	72	74	Norias de Bajan	1,000	880	920
Carmen, aviada	1,100	135	150	SAN LUIS POTOSI:			
Guadalupe Fresnillo Mill	1,000	170	200	Concepcion y An	3,000	50	55
Guadalupe Fresnillo Mine	1,400	70	80	El Barreno, aviadora	2,000	80	82
Maravillas y An., aviador	1,680	110	150	Sta. Maria de la Paz	9,600	210	212
Maravillas el Lobo	1,000	130	180	ZACATECAS:			
Refugio, aviada	12,800	680	740	Asturiana y An	2,500	10	16
Sta. Gertrudis y An aviadas	9,600	12	14	Candelaria y Pinos	2,500	42	45
Sta. Gertrudis y An. aviadora	28,800	73½	78	San Carlos y Anexas	2,500	55	65
San Rafael y An., Trompillo	1,200	1,940	1,955	Sta. Maria de Gaud	2,500	89	95
San Rafael y An., aviada	1,200	710	720	MISCELLANEOUS:			
				Bartolome de Medina	2,000	98	102
				Naica (Chihuahua)	100	11,000	13,000
				Natividad (Oxaca) aviadora	1,800	950	1,000
				San Francisco Hac	6,000	100	103
				Union Hacienda	3,000	325	360

LONDON. Sept. 23

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Latest dividend. Date.	Quotations. Buyers.	Quotations. Sellers.
American:		£ s. d.	s. d.		£ s. d.	£ s. d.
Alaska-Treadwell	200,000	5 0 0	2 0	July, 1904	4 12 6	4 17 6
Anaconda	1,200,000	5 0 0	2 0	May, 1904	4 12 6	4 15 0
Camp Bird	820,000	1 0 0	9	Aug., 1904	1 8 0	1 8 6
Copiapo	112,500	2 0 0	6 10	May, 1903	1 0 0	1 5 0
De Lamar	80,000	1 0 0	1 6	May, 1904	13 9	16 3
El Oro	1,080,000	1 0 0	9	July, 1904	18 9	1 1 3
Esperanza	455,000	1 0 0	6	Aug., 1904		
Frontino & Bolivia	128,662	1 0 0	3 0	July, 1901	8 6	9 6
Le Roi	200,000	5 0 0	5 0	Nov., 1899	13 9	16 3
Le Roi No. 2	120,000	5 0 0	1 0	June, 1904	11 3	13 9
Palmarejo & Mexican	445,000	1 0 0	rts.	Apr., 1903	8 3	8 9
Standard	500,000	4 0	2½	Sept., 1903	2 0	3 0
Stratton's Independence	1,000,007	1 0 0	6	Dec., 1903	2 3	2 9
St. John del Rey	546,265	1 0 0	6	Dec., 1903	13 6	14 6
Tomboy	300,000	1 0 0	1 0	June, 1902	1 0 0	1 5 0
Ymir	200,000	1 0 0	1 0	Mar., 1902	2 6	5 0
European:						
Linares	15,000	3 0 0	5 0	Sept., 1904	3 15 0	4 5 0
Mason & Barry	185,172	1 0 0	7 0	May, 1904	2 15 0	3 0 0
Rio Tinto	325,000	5 0 0	37 6	May, 1904	56 2 6	56 7 6
Rio Tinto, preferred	325,000	5 0 0	2 6	May, 1904	6 0 0	6 5 0
Tharsis	625,000	2 0 0	7 0	May, 1904	4 10 0	4 15 0
West Australian:						
Associated	495,388	1 0 0	2 6	July, 1904	1 16 3	1 17 6
Cosmopolitan	400,000	1 0 0	1 0	Apr., 1904	6 9	7 3
Golden Horseshoe	300,000	5 0 0	6 0	Aug., 1904	6 3 9	6 6 3
Great Boulder	1,750,000	2 0	9	Sept., 1904	19 3	19 9
*Gt. Boulder Persever ce	1,400,007	1 0 0	1 0	Sept., 1904	10 9	11 3
Great Fingall	250,000	1 0 0	7 0	July, 1904	7 11 3	7 13 9
Ivanhoe	200,000	5 0 0	5 0	Oct., 1904	6 18 9	7 1 3
Kalgurli	120,000	1 0 0	2 6	Oct., 1904	5 0 0	5 2 6
Lake View	250,000	1 0 0	rts.	Aug., 1902	1 1 3	1 3 9
Oroya-Brownhill	450,000	1 0 0	3 0	Sept., 1904	3 3 9	3 6 3
Miscellaneous:						
*Brilliant Central	100,000	1 0 0	1 0	Sept., 1904	2 6 3	2 8 9
Briseis	600,000	1 0 0	....	....	9 3	9 9
Broken Hill	960,000	8 0	1 0	Aug., 1904	1 19 6	2 0 6
Mt. Lyell	275,000	3 0 0	1 3	June, 1904	9 6	10 6
*Mt. Morgan	1,000,000	1 0 0	3	Oct., 1904	2 1 3	2 3 9
*Waihi	497,412	1 0 0	2 6	Sept., 1904	5 10 0	5 12 6
Indian:						
*Champion Reef	513,832	10 0	1 4	Sept., 1904	1 11 0	1 12 0
Mysore	566,043	10 0	4 6	July, 1904	6 7 6	6 10 0
Nundydroog	484,000	10 0	1 3	July, 1904	1 16 0	1 17 0
Ooregum	343,000	10 0	1 3	Aug., 1904	16 0	17 0
Ooregum, pfd	240,000	10 0	4	Aug., 1904	1 6 3	1 8 9
South African:						
Angelo	600,000	1 0 0	7 0	Aug., 1904	6 12 6	6 17 6
Bonanza	200,000	1 0 0	8 0	Aug., 1904	1 1 3	1 3 9
British South Africa	4,436,019	1 0 0	rts.	May, 1899	1 5 3	1 6 9
Cape Copper	300,000	2 0 0	2 6	July, 1904	3 12 6	3 15 0
Cape Copper, pfd	75,000	2 0 0	2 6	July, 1904	3 10 0	3 15 0
City & Suburban	340,000	4 0 0	4 0	Aug., 1904	5 3 9	5 6 3
Consol. Gold-Fields	2,000,000	1 0 0	....	....	6 1 3	6 3 9
Crown Reef	120,000	1 0 0	6 0	Aug., 1904	14 10 0	15 0 0
*De Beers, preferred	800,000	2 10 0	10 0	Aug., 1904	18 3 9	18 6 3
*De Beers, deferred	1,000,000	2 10 0	12 6	Aug., 1904	18 11 3	18 13 9
East Rand	990,000	1 0 0	5 0	July, 1903	7 18 9	8 0 0
Ferreira	90,000	1 0 0	22 6	Aug., 1904	20 10 0	21 0 0
Geldenhuis	200,000	1 0 0	7 0	Aug., 1904	5 7 6	5 10 0
Geduld	400,000	1 0 0	rts.	Mar., 1902	6 2 6	6 5 0
Henry Nourse	125,000	1 0 0	8 0	Aug., 1904	7 17 6	8 2 6
Jubilee	50,000	1 0 0	5 0	Aug., 1904	4 12 6	4 17 6
Jumpers	100,000	1 0 0	2 6	May, 1904	2 10 0	2 15 0
Langlaagte	470,000	1 0 0	2 0	Aug., 1904	3 8 9	3 11 3
May	288,750	1 0 0	3 0	Aug., 1904	3 18 9	4 1 3
Meyer & Charlton	100,000	1 0 0	5 0	Aug., 1904	5 5 0	5 10 0
Modderfontein	290,000	1 0 0	rts.	Apr., 1902	8 8 9	8 11 3
Namaqua	94,331	2 0 0	3 0	Dec., 1903	2 17 6	3 2 6
New Jagersfontein	200,000	5 0 0	10 0	June, 1904	26 15 0	27 5 0
New Primrose	325,000	1 0 0	3 0	Aug., 1904	3 10 0	3 12 6
Rand	1,795,956	5 0	5 0	Aug., 1902	10 1 3	10 3 9
Robinson	750,000	5 0 0	6 0	Aug., 1904	9 5 0	9 10 0
Robinson Deep	950,000	1 0 0	3 0	Aug., 1904	5 5 0	5 7 6
Rose Deep	425,000	1 0 0	3 0	Aug., 1904	8 10 0	8 15 0
Salisbury	100,000	1 0 0	2 0	Sept., 1904	1 15 0	1 17 6
Village Main Reef	400,000	1 0 0	4 0	July, 1904	6 7 6	6 10 0
Wemmer	80,000	1 0 0	12 6	July, 1904	10 10 0	11 0 0

*Ex-dividend.

LONDON (By Cable.)*

Company.	Sept. 28 £	Sept. 28 s.	Sept. 28 d.	Oct. 5 £	Oct. 5 s.	Oct. 5 d.	Company.	Sept. 28 £	Sept. 28 s.	Sept. 28 d.	Oct. 5 £	Oct. 5 s.	Oct. 5 d.
Camp Bird	1	8	3	1	8	3	Esperanza	....	17	6	....	17	0
Con. Gold Fields	6	0	0	6	7	6	Modderfontein	8	8	9	9	1	3
De Beers	18	12	6	18	15	0	Rand Mines	10	3	9	10	8	9
Dolores	1	6	0	1	5	0	Rio Tinto	56	15	0	57	5	0
East Rand	7	18	9	8	6	3	Simmer & Jack	1	13	9	1	15	0
El Oro		19	4½	19	4½		Tomboy	1	0	7½	1	1	3

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Sept. 15.

Company.	Location.	Capital Stock.	Par value.	Latest dividend.	Prices. Opening.	Prices. Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal	France	....	....	290.00	5,750.00	5,725.00
Boleo, c	Lower Cal.	12,000,000	500	104.17	2,228.00	2,245.00
Champ d'Or, g	S. Africa	3,375,000	25	3.75	16.75	16.75
Courrieres, Coal	France	600,000	500	110.00	2,899.00	2,910.00
Fraser River, g	Brit. Col	250,000	25	....	5.50	5.50
Huanchaca, s	Bolivia	40,000,000	125	2.50	92.75	92.75
Laurium, z. l	Greece	16,300,000	500	25.00	309.00	309.00
Malfidano, z	Italy	12,500,000	500	50.00	615.00	625.00
Metaux, Cie. Fran. de	France	25,000,000	500	22.50	505.00	510.00
Mokta-el-Hadid, i. l	Algeria	18,312,000	500	40.00	1,010.00	1,022.00
Nickel, n	N. Caledonia	15,000,000	250	22.50	622.00	639.00
Penarroya, Coal	Spain	....	500	45.00	1,150.00	1,130.00
Vielle Montagne, z	Belgium	9,000,000	30	30.00	784.00	778.00

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. s—Silver. z—Zinc.

DIVIDENDS.

GOLD, SILVER, LEAD, QUICKSILVER AND ZINC COMPANIES.

Name and Location of Company.	Author-ized Capital.	Shares. Issued.	Par Val $	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Acacia, g. Colo.	$1,500,000	1,443,000	1		$57,560	Apr. 1903	$0.01
Adams, s.l.c. Colo.	1,500,000	150,000	10		738,500	Oct. 1902	.05
Aetna Con., q. Cal.	500,000	100,000	5		325,000	Apr. 1900	.15
Alaska-Mexican, g. Alaska	1,000,000	180,000	5	$81,000	654,381	July 1904	.15
Alaska-Treadwell, g Alaska	5,000,000	200,000	25	325,000	5,370,000	July 1904	.50
Amalgamated, c Mont.	155,000,000	1,530,879	100	2,308,290	25,042,697	Aug. 1904	.50
Am.Sm.& Ref.,com U. S.	50,000,000	500,000	100	2,500,000	2,500,000	Oct. 1904	1.25
Am.Sm & Ref. pf. U. S.	50,000,000	500,000	100	3,500,000	15,891,553	Oct. 1904	1.75
Anaconda, c. Mont.	30,000,000	1,200,000	25	600,000	23,850,000	May 1904	.50
Annie Laurie, g. Utah.	5,000,000	25,000	100	125,000	400,000	Sept. 1904	.50
Arizona, c. Ariz. *	3,775,000			815,548	5,483,806	July 1904	
Bald Butte, g.s. Mont.	250,000	200,000	1	25,000	1,337,148	Jan. 1904	.12½
Big Six, s.l. Colo.	500,000	500,000	1		17,500	Nov. 1903	.00½
Bonanza King, g. Colo.	1,000,000	1,000,000	1	5,000	5,000	Feb. 1904	.00½
Boston & Colo. Sm Colo.	750,000	15,000	50		402,350	Oct. 1902	.75
Boston & Mont. Mont.	3,750,000	150,000	25	1,050,000	29,375,000	July 1904	3.00
Breece, l.s. Colo.	5,000,000	200,000	25		200,000	June 1903	.05
Bunker Hill & Sull. Idaho	3,000,000	300,000	10	513,000	2,039,000	Sept. 1904	.25
Butler-Liberal, g.s. Utah.	500,000	500,000	1		2,500	Dec. 1903	.00½
Butte & Boston, c. Mont.	2,500,000	200,000	25	200,000	1,800,000	Feb. 1904	1.00
Calumet&Arizona,c Ariz.	2,500,000	200,000	10	900,000	1,300,000	Sept. 1904	1.50
Calumet & Hecla, c Mich.	2,500,000	100,000	25	3,000,000	86,350,000	Sept. 1904	10.00
Camp Bird, g. Colo.	5,500,000	820,000	5	639,600	1,607,304	Aug. 1904	.18
Cashier Colo	1,000,000	900,000	1	8,340	26,160	Apr. 1904	.00½
Center Creek, l.z. Mo.	1,000,000	100,00	10	10,000	140,000	Apr. 1904	.10
Central Eureka, g Cal.	4,000,000	398,425	10	151,411	387,396	Sept. 1904	.05
Central, l. Mo.	1,000,000	10,000	100	35,000	420,000	Sept. 1904	.50
Century, g.s.l Utah.	150,000	150,000	1	20,000	28,000	July 1904	.02
C. K. & N., g. Colo.	1,500,000	1,431,900	1	100,233	171,828	Sept. 1904	.01
Clinton, g.s. Colo.	100,000	1,000	100		60,000	Dec. 1903	.30
Con. Mercur, g Utah.	5,000,000	1,000,000	5		1,030,000	May 1903	.03
Continental, z. Mo.	550,000	22,000	25	26,400	79,200	July 1904	.40
Daly-West, g.s.l. Utah.	3,600,000	180,000	20	828,000	4,319,000	Sept. 1904	.40
De Lamar, g.s Idaho	400,000	67,180	5	24,184	2,764,524	May 1904	.36
Deadwood-Stand,pf So. Dak.	600,000	600,000	1		6,000	Dec. 1903	.01
Doe Run, l. Mo.	1,500,000	15,000	100	67,500	604,572	July 1904	1.50
Elkton Con., g Colo.	3,000,000	2,500,000	1		1,404,461	Mar. 1902	.04
El Paso, g. Colo.	2,500,000	2,450,000	1	110,250	274,550	Sept. 1904	.01
Federal Sm., com. Idaho	10,000,000	52,500	100	157,500	157,500	Sept. 1904	1.50
Federal Sm., pf. Idaho	20,000,000	105,000	100	551,250	735,000	Sept. 1904	1.75
Gemini, g.s.l Utah.	500,000	5,000	100	50,000	1,100,000	Mar. 1904	10.00
Gold Coin, g Colo.	1,000,000	1,000,000	1		1,230,000	Jan. 1903	.01
Gold King Colo.	1,000,000	936,850	1	14,053	473,109	Jan. 1904	.01½
Golden Cycle, g Colo.	2,000,000	1,500,000	1		303,750	Aug. 1903	.03
Good Hope, g.s Colo.	50,000	500	100		941,25	Jan. 1903	.25
Grand Central, g Utah.	250,000	250,000	1	175,000	1,066,250	Aug. 1904	.10
Gwin, g. Cal.	1,000,000	100,000	10		246,500	Dec. 1902	.15
Hecla, s.l. Idaho	250,000	1,000,000	½	30,000	150,000	May 1904	.01
Hecla Con., s.l Mont.	1,500,000	30,000	50		2,930,550	Apr. 1902	.25
Hercules-Horsh'e, g Cal.	1,000,000	340,000	1	2,250	2,250	June 1904	.00½
Homestake, g. So. Dak.	21,840,000	218,400	100	491,400	12,859,150	Sept. 1904	.25
Horn Silver,g.s.c.z.l Utah.	10,000,000	400,000	25	60,000	5,422,000	Sept. 1904	.05
Internat. Nickel, pf U. S.	12,000,000	87,415	100		349,660	May 1903	10.00
Iowa, g.s.l. Colo.	1,666,667	1,666,667	1	50,001	386,838	July 1904	.01
Iron Silver Colo.	10,000,000	500,000	20	250,000	3,100,000	Oct 1904	.10
Jamison, g Cal.	3,900,000	390,000	10	35,100	156,000	July 1904	.03
Kendall, g. Mont.	2,500,000	500,000	5	275,000	580,000	Sept. 1904	.05
Last Dollar, g. Colo.	1,500,000	1,500,000	1		240,000	Mar. 1904	.02
Liberty Bell, g Colo.	700,000	130,349	1	39,104	130,337	Apr. 1904	.15
Lightner, g. Cal.	125,000	102,255	1	48,291	234,906	Sept. 1904	.05
Lyon, z.l. Mo.	50,000	4,000	10	1,200	1,200	Apr. 1904	.30
Mammoth, g.s.l. Utah.	10,000,000	400,000	25	20,000	1,880,000	July 1904	.05
Mary McKinney, g. Colo.	1,000,000	1,000,000		60,000	620,000	July 1904	.03
May Day, g Utah.	100,000	400,000	¼		30,000	Mar. 1902	.01
Mine La Motte, l. Mo.	3,300,000	300,000	10	60,000	300,000	Jan. 1904	.20
Mines Co. of Am. U. S.	2,000,000	2,000,000	1	270,000	735,000	Sept. 1904	.01½
Modoc, g.s. Colo.	500,000	500,000	1		270,000	Dec. 1903	.01
Mont. Ore Purch. Mont.	2,500,000	81,000	25	324,000	3,618,000	Apr. 1904	4.00
Mont.-Tonopah, g Nev.	1,000,000	885,000	1		42,750	Dec. 1903	.05
Mountain, c. Cal.	6,250,000	250,000	25		3,776,250	May 1903	1.57
Napa Con., q Cal.	700,000	100,000	7		1,180,000	Oct. 1902	.10
Nat. Lead, pf U. S.	15,000,000	149,040	100	782,460	14,754,628	Sept. 1904	1.75
Nevada Keystone,g Nev.	1,000,000	638,877	1	19,166	61,790	Feb. 1904	.03
New Century, z. Mo.	150,000	150,000	1	6,750	6,750	Sept. 1904	.00½
New Idria, q. Cal.	500,000	100,000	5	150,000	670,000	Oct. 1904	.30
New Jersey, z. U. S.	10,000,000	100,000	100	600,000	6,600,000	May 1904	3.00
North Star, g. Cal.	2,500,000	250,000	10	62,500	768,856	July 1904	.25
Northern Light, g.s Utah.	2,000,000	400,000	5	20,000	20,000	Feb. 1904	.05
Old Gold, g. Colo.	2,101,150	2,101,150	1	10,506	10,506	Mar. 1904	.00½
Ontario, s.l. Utah.	15,000,000	150,000	100		14,917,000	Dec. 1902	.30
Ophir, g.s. Nev.	302,400	100,800	3	221,850	1,797,400	July 1904	.25
Osceola, c. Mich.	2,500,000	96,150	25	192,300	4,439,600	July 1904	1.00
Ousotmah, g. Cal.	250,000	250,000	1	12,500	12,500	Mar. 1904	.05
Parrot, c. Mont.	2,300,000	229,850	10	114,925	5,887,860	Aug. 1904	.50
Pennsylvania, g. Cal.	5,150,000	51,500	100	41,350	233,425	Sept. 1904	.10
Portland, g Colo.	3,000,000	3,000,000	1	540,000	5,197,080	July 1904	.06
Quicksilver, pf. Cal.	4,300,000	43,000	100		1,931,411	May 1903	.50
Quilp, g. Wash.	1,500,000	1,500,000	1	15,000	15,000	Apr. 1904	.01
Quincy, c Mich.	2,500,000	100,000	25	500,000	14,620,000	Aug. 1904	2.50
Red Bird, g.s.c.l. Mont.	1,500,000	300,000	5	27,000	63,000	Sept. 1904	.01
Rob Roy, z. Mo.	15,000	13,825	1	692	2,945	May 1904	.03
Rocco Homest'k,l.s Nev.	300,000	300,000	1	4,000	94,000	Jan. 1904	.01
Sacramento, g Utah.	5,000,000	1,000,000	5	20,000	213,000	Aug. 1904	.00½
Salvator, g.s.l. Utah.	200,000	200,000	1	6,500	6,500	Aug. 1904	.01
St. Joseph, l. Mo.	6,000,000	375,000	10	168,750	4,003,250	Sept. 1904	.15
Silver Hill, g.s Nev.	180,000	180,000	1	18,000	46,800	Mar. 1904	.05
Silver King, g.s.l Utah.	3,000,000	150,000	20	1,000,000	8,350,000	Sept. 1904	.66⅔
Smuggler, s.l.z Colo.	1,000,000	1,000,000	5		2,175,000	Feb. 1902	.01
South Swansea Utah.	300,000	300,000	1	3,000	168,000	Apr. 1904	.01
Spearfish, g., pf So. Dak.	1,000,000	882,000	1	8,820	105,840	July 1904	.00½
Specie Payment, g. Colo.	1,000,000	1,000,000	1		65,190	Oct. 1903	.01
Standard Con., g.s. Cal.	2,000,000	178,394	10	53,517	1,231,687	Aug. 1904	.10
Standard, c. Ariz.	500,000	500,000	1		40,000	Sept. 1903	.05
Stratton's Independ Colo.	5,500,000	1,000,007	5		4,130,860	Dec. 1903	.12½
Swansea, s.l Utah.	500,000	100,000	5		330,050	June 1902	.05
Tamarack, c. Mich.	1,500,000	60,000	25	90,000	8,580,000	Jan. 1904	1.50
Tennessee, c. Tenn.	5,000,000	175,000	25	218,750	437,500	Jan. 1904	1.25
Tetro, g.l. Utah.	300,000	300,000	1	9,000	9,000	Aug. 1904	.01
Tomboy, g.s. Colo.	1,500,000	300,000	5		1,244,000	July 1902	.24
Tonopah Alpine, g. Nev.	700,000	700,000	1		70,000	Dec. 1903	.10
Town Topics, g.s. Colo.	1,000,000	1,000,000	1		50,000	Nov. 1903	.00½
Trinity County, g Cal.	1,000,000	99,002	10		34,561	July 1903	.05
Uncle Sam. Utah.	200,000	200,000	1	5,000	50,000	Aug. 1904	.02½
United (Creede), g. Colo.	500,000	500,000	1	10,000	55,000	Mar. 1904	.02
Union, g. Colo.	1,250,000	1,250,000	1		445,244	Jan. 1903	.02
United, c., pf Mont.	5,000,000	50,000	100	150,000	600,000	May 1904	3.00
United, z.l., com. Mo.	5,000,000	78,900	5		30,725	Oct. 1903	.05
United, z.l., pf. Mo.	1,000,000	18,998	25	18,998	144,354	July 1904	.50
United Verde, c. Ariz.	3,000,000	300,000	10	1,350,000	16,410,322	Sept. 1904	.75
U.S.Red.&Ref.,cm Colo.	6,000,000	59,188	100		414,078	Oct. 1903	1.00
U.S.Red.&Ref., pf. Colo.	4,000,000	39,458	100		492,821	Oct. 1903	1.50
United States,g.s.c Utah.	21,500,000	480,000	25	210,000	210,000	Aug. 1904	.50
Utah, g Utah.	1,000,000	100,000	10	4,000	225,000	June 1904	.01
Utah Con., c. Utah.	1,500,000	300,000	5	900,000	2,586,000	July 1904	1.50
Vindicator Con., g. Colo.	1,500,000	1,100,000	1	66,000	1,181,000	July 1904	.03
Waldorf, g Colo.	3,000,000	3,000,000	1		15,000	Aug. 1904	.00½
Wasp No. 2, g. So. Dak.	500,000	147,900	1	16,269	234,679	June 1904	.03
Wolverine, c. Mich.	1,500,000	60,000	25	450,000	1,770,000	Oct. 1904	4.00
Yellow Aster, g Cal.	1,000,000	100,000	10	30,000	583,789	Feb. 1904	.15

COAL, IRON AND OTHER INDUSTRIALS.

Name and Location of Company.	Author-ized Capital.	Shares. Issued.	Par Val $	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Ala. Con., C.& I., pf Ala.	$2,500,000	$24,638	100	$129,351	$819,031	Sept. 1904	$1.75
Allis-Chalmers, pf. U. S.	25,000,000	200,000	100	350,000	3,213,750	Feb. 1904	1.75
Alma Oil. Cal.	400,000	380,000	1		45,600	Dec. 1903	.03
Amer.Ag.Chm.,pf. U. S.	20,000,000	181,350	100	535,990	5,206,750	Apr. 1904	3.00
American Cement. Pa.	2,000,000	200,000	10	160,000	700,000	July 1904	.40
American Coal. Md.	1,500,000	50,000	25	125,000	1,557,500	Sept. 1904	1.25
Bon Air C. & I., pf. Tenn.	2,500,000	18,803	100	84,615	221,551	July 1904	1.50
Cambria Steel. Pa.	50,000,000	900,000	50	1,350,000	7,800,000	Aug. 1904	.75
Caribou Oil. Cal.	100,000	80,000	1	5,600	5,600	Sept. 1904	.07
Central C.&C.,com. Mo.	5,125,000	51,250	100	307,500	858,750	Oct. 1904	1.50
Central C.& C., pf. Mo.	1,875,000	18,750	100	93,748	890,620	Oct. 1904	1.25
Central Oil. W. Va.	1,500,000	60,000	25	45,000	197,500	Aug. 1904	.25
Claremont Oil. Cal.	500,000	500,000	1	15,000	15,000	Aug. 1904	.01
Colo.Fuel & I., com Colo.	38,000,000	239,310	100		1,642,500	Apr. 1902	1.75
Colo. Fuel & I., pf. Colo.	2,000,000	20,000	100		1,560,000	Feb 1903	4.00
Colum.&Hock.C&I Ohio.	70,000,000	69,244	100	51,933	138,464	Aug. 1904	.25
Consolidated Coal. Ill.	5,000,000	50,000	100	150,000	450,000	July 1904	1.00
Consolidation Coal. Md.	10,250,000	102,500	100	410,000	6,946,650	Feb. 1904	4.00
Crucible Steel, pf. U. S.	25,000,000	250,000	100		5,250,000	Sept. 1903	1.75
Dabney Oil. Cal.	1,200,000	1,000,000	1	37,500	182,500	Feb. 1904	.03¾
Empire S. & I., pf. U. S.	5,000,000	23,700	100	44,550	611,900	July 1904	1.50
Fairmont Coal. W. Va.	12,000,000	120,000	100	240,000	240,000	Feb. 1904	2.00
Four Oil. Cal.	300,000	208,700	1	18,783	79,145	Sept. 1904	.01
General Chem., com U. S.	12,500,000	74,103	100		1,300,507	Dec. 1903	1.25
General Chem., pf. U. S.	12,500,000	100,000	100	600,000	3,175,178	Oct. 1904	1.50
Giant Oil. Cal.	800,000	800,000	1		144,000	Jan. 1904	.02
Home Oil. Cal.	100,000	100,000	1	12,500	505,000	Sept. 1904	.02½
Houston Oil, pf. Tex.	7,500,000	75,000	100		896,500	Feb. 1903	3.00
Imperial Oil. Cal.	1,000,000	100,000	100	200,000	700,000	Oct. 1904	.20
Ill. Crude Oil. Cal.	200,000	200,000	1	5,000	5,000	Sept. 1904	.01¼
Int'l Acheson, pf. N. Y.	500,000	5,000	100		105,000	July 1903	3.50
Jeff.&Cl'f.C.&I.com. Pa.	1,500,000	15,000	100	75,000	225,000	Aug. 1904	5.00
Jeff.& Cl'f.C.&I., pf Pa.	1,500,000	15,000	100	75,000	675,000	Aug. 1904	2.50
Keystone Oil. Colo.	2,000,000	2,000,000	1	8,000	8,000	July 1904	.00⅔
Lehigh Coal & Nav. Pa.	14,346,650	286,933	50	502,133	21,543,582	May 1904	1.75
Maryland Coal, pf. Md.	2,000,000	18,850	50	65,975	1,112,110	June 1904	3.00
Monong.R.Coal, pf. Pa.	10,000,000	97,300	100	347,165	3,124,485	Jan. 1904	3.50
Monte Cristo Oil. Cal.	500,000	500,000	1	35,000	70,000	Sept. 1904	.01
National Carbon, pf. U. S.	4,500,000	45,000	100	236,250	1,811,250	Aug. 1904	1.75
New Central Coal. Md.	1,000,000	50,000	20	20,000	270,000	Mar. 1904	.40
Ohio & Ind. Gas. U. S.	10,000,000	900,000	100		1,440,000	Dec. 1903	1.00
Oil City Petroleum Cal.	500,000	500,000	1	15,000	15,000	Sept. 1904	.00½
Pacific Coast Borax Cal.	2,000,000	19,000	100	343,000	1,877,500	Sept. 1904	1.00
Peerless Oil. Cal.	1,000,000	92,000	10	115,840	306,240	Oct. 1904	.14
Penna. Salt. Pa.	3,000,000	60,000	50	180,000	13,630,000	Apr. 1904	3.00
Penna. Steel. Pa.	25,000,000	168,214	100	1,588,749	4,094,499	May 1904	3.50
Phila. Gas, com Pa.	28,953,029	579,061	50	1,595,552	5,012,383	Nov. 1904	.75
Phila. Gas, pf. Pa.	5,744,813	114,896	50	287,212	1,439,885	June 1904	1.25
Pittsburg Coal, pf. Pa.	32,000,000	297,012	100	1,559,313	9,875,649	July 1904	1.75
Pittsburg Oil. Cal.	300,000	240,000	1		48,000	Dec. 1903	.02½
Pocahontas Coll.,pf W. Va.	1,500,000	15,000	100	67,500	257,500	Sept. 1904	.50
Rep.Iron & Steel,pf U. S.	25,000,000	204,169	100		6,053,476	Oct. 1903	1.75
San Joaquin Oil. Cal.	100,000	100,000	1	440,000	625,000	Mar. 1904	2.20
Shelby Iron. Ala.	1,000,000	10,000	100		840,000	Nov. 1903	5.00
Sloss-Sheffield, pf. Ala.	20,000,000	67,000	100	469,000	2,205,000	Oct. 1904	1.75
Somerset Coal. Pa.	4,000,000	40,000	100	80,000	80,000	Feb. 1904	2.00
St. Bernard C. & C. Ky.Ten	1,000,000	10,090	100		770,000	Dec. 1903	6.00
Standard Oil. U. S.	100,000,000	970,000	100	28,130,000	236,110,000	Sept. 1904	5.00
Sunday C'k Coal,pf Ohio.	1,500,000	15,000	100		15,750	Aug. 1903	3.00
Susq. I. & S., pf. Pa.	1,500,000	300,000	5		762,500	June 1903	3.15
Temple Iron. Pa.	240,000	2,400	100		21,500	July 1903	2.00
Tenn. C. I., com. Tenn.	23,000,000	225,536	100		1,102,600	Nov. 1900	2.00
Tenn. C. I., pf. Tenn.	248,000	2,480	100	14,880	321,984	Aug. 1904	2.00
Texas& Pacific Coal Texas.	2,000,000	20,000	100	30,000	1,890,000	Oct. 1904	1.50
Thirty-three Oil. Cal.	500,000	100,000	5	100,000	340,000	Oct. 1904	.10
Thomas Iron. Pa.	2,500,000	25,000	200		200,000	Aug. 1903	4.00
Tidewater Steel, pf Pa.	600,000	60,000	1		30,000	July 1903	.20
Union Oil. Cal.	10,000,000	52,672	100	73,740	889,682	Apr. 1904	.70
Union Nat'l Gas. Pa.	8,000,000	22,500	100	135,000	315,000	July 1904	2.00
U.S.Steel Corp., cm U. S.	550,000,000	5,083,025	100		53,360,978	Dec. 1903	1.50
U.S.Steel,Corp.,pf. U. S.	360,281,100	3,602,811	100	18,915,913	111,792,816	Aug. 1904	1.75
Va.Carolina Ch.,cm U. S.	38,000,000	279,844	100		3,678,829	June 1903	1.25
Va.Carolina Ch.,pf. U. S.	20,000,000	180,000	100	1,200,000	8,220,869	Oct. 1904	2.00
Westmoreland Coal Pa.	3,000,000	60,000	50	30,000	8,280,000	Oct. 1904	.50
West Shore Oil. Cal.	100,000	100,000	1	30,000	135,000	Sept. 1904	.05

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.	Author-ized Capital.	Shares. Issued.	Par Val $	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Amistad y Conc'dia Mex.	$480,000	9,600	50	$61,482	$226,768	July 1904	$1.67
Barreno, g.s. Mex.	12,000	2,400	5	6,036	69,982	Aug. 1904	.90
Bart. de MedinaMil Mex.	50,000	2,000	25	14,723	94,451	Sept. 1904	.69
Buena Vista, g.s. Mex.	100,000	2,000	100		5,000	Sept. 1903	5.00
Butters' Salvador,g Salv.	750,000	150,000	5	150,000	525,000	Oct. 1904	.25
Cariboo McKin'y,gs B. C.	1,250,000	1,250,000	1	50,000	546,837	Feb. 1904	.04
Carmen, g.s. Mex.	27,500	1,100	25	2,519	81,135	Sept. 1904	2.29
Carmen-Guanaj.g.s Mex.	725,000	145,000	5		27,750	Oct. 1903	.12½
Cinco Senores. Mex.		2,000			711,935	July 1903	4.10
Copiapo, c. Chile	1,125,000	112,500	10		2,865,900	Feb. 1903	.36
Crow's Nest Pass. N. S.	3,500,000	121,486	25	172,524	968,947	Apr. 1904	2.50
Dominion Coal,com N. S.	15,000,000	150,000	100		1,050,000	Dec. 1903	1.75
Dominion Coal, pf. N. S.	3,000,000	30,000	100	120,000	2,400,000	July 1904	4.00
Dominion I.&S., pf. N. S.	5,000,000	50,000	100		875,000	Sept. 1903	3.50
Dos Estrellas, g.s. Mex.	150,000	3,000	50	120,750	703,575	Sept. 1904	4.60
El Oro, g.s Mex.	5,750,000	1,080,000	5	194,400	2,708,800	July 1904	.18
Esperanza, s.g Mex.	2,275,000	455,000	5	168,350	1,322,549	Aug. 1904	.12
Fraternal, s Mex.	5,000	1,000	5	23,875	75,138	Aug. 1904	2.38
Granby Con B. C.	13,363,030	1,336,303	10		133,630	Dec. 1903	.10
Greene Con., c Mex.	8,640,000	864,000	10	777,600	1,429,420	Oct. 1904	.30
Guadalupe Mex.	1,000,000	10,000	100		3,515,750	Apr. 1903	.77
Guggenheim Expl Mex.	17,000,000	105,000	100	735,000	1,286,250	Oct. 1904	1.75
Le Roi No. 2, g. B. C.	3,000,000	120,000	35	57,600	345,600	June 1904	.24
Mex. Coal & Coke Mex.	5,000,000	50,000	100	150,000	130,000	June 1904	3.00
Natividad, s.g Mex.	36,000	2,400	15	108,000	380,463	Sept. 1904	5.00
N.Y.& Hond. Ros. C. A.	1,500,000	150,000	10	105,000	1,890,000	Sept. 1904	.10
N. S. St.&Coal,com. N. S.	5,000,000	50,000	100	213,600	638,600	Apr. 1904	3.00
N. S. St.& Coal, pf. N. S.	2,000,000	10,300	100	41,200	247,200	Apr. 1904	2.00
Penoles, s.g Mex.	125,000	2,500	50	403,750	2,891,864	Sept. 1904	18.30
Providence, g.s B. C.	200,000	40,000	5	4,000	6,224	June 1904	.10
Providencia (S.J.). Mex.	90,000	6,000	15		169,740	Feb. 1903	.77
Real del Monte Mex.		2,554		11,238	2,938,122	Jan. 1904	4.40
San Francisco Mill. Mex.	150,000	6,000	25	10,920	298,080	Aug. 1904	.68
San Rafael Mex.	60,000	2,400	25	209,609	2,246,126	Sept. 1904	
Soledad, s.l. Mex.	19,200	960	20	53,974	318,616	Sept. 1904	9.15
Sopressa, g.s. Mex.	19,200	960	20	21,488	221,554	Sept. 1904	2.29
Sta. Gertrudis, g.s. Mex.	1,920,000	38,000	50	81,184	2,861,344	Sept. 1904	
St. John del Rey, g. Brazil	3,000,000	546,265	5		14,158,949	Dec. 1903	.12
Sta. Maria de la Paz Mex.		2,400		27,106	1,989,479	Aug. 1904	2.39
Torreon Metallurg'l Mex.	1,500,000	30,000	50		269,500	May 1903	8.98
Tyee,c. B. C.	940,000	180,000	5	43,200	43,200	Apr. 1904	.24
Union Mill Mex.	150,000	3,000	50	16,170	429,593	May 1904	1.79

NOTE: These dividends are published gratuitously. Readers are invited to send any additions or corrections which they think necessary to complete our list.